

Railway Age

DAILY EDITION

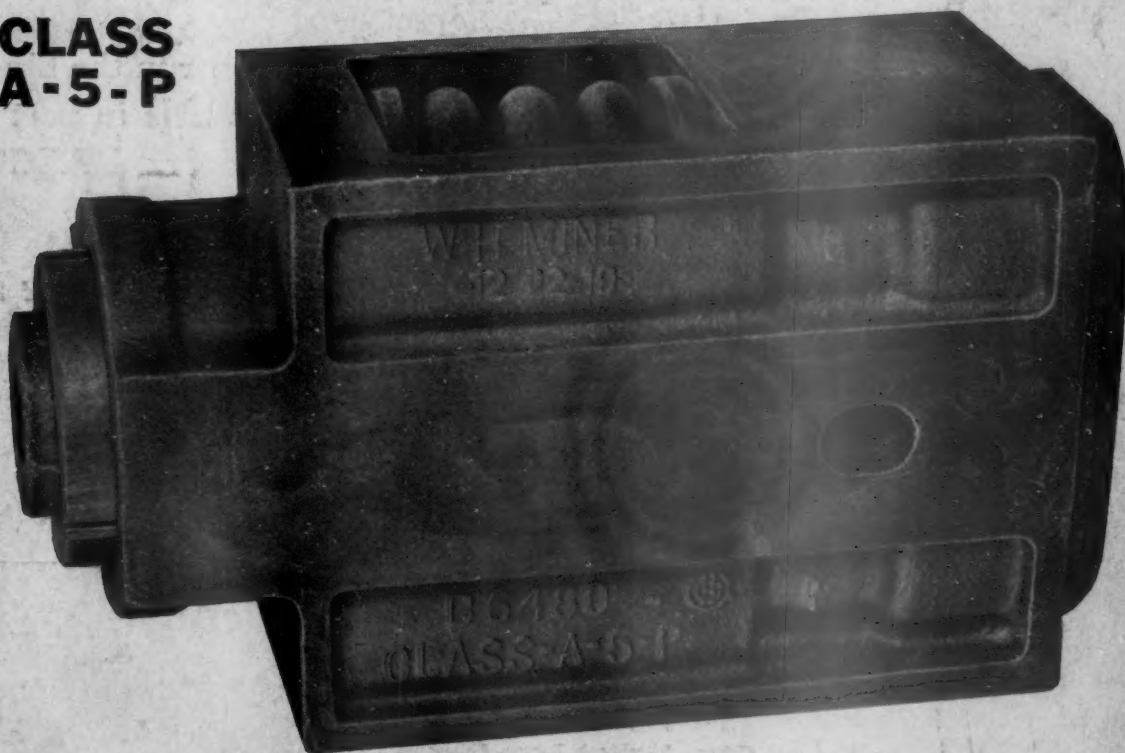
FIRST HALF OF 1920, No. 24d NEW YORK—TUESDAY, JUNE 15, 1920—ATLANTIC CITY SIXTY-FIFTH YEAR

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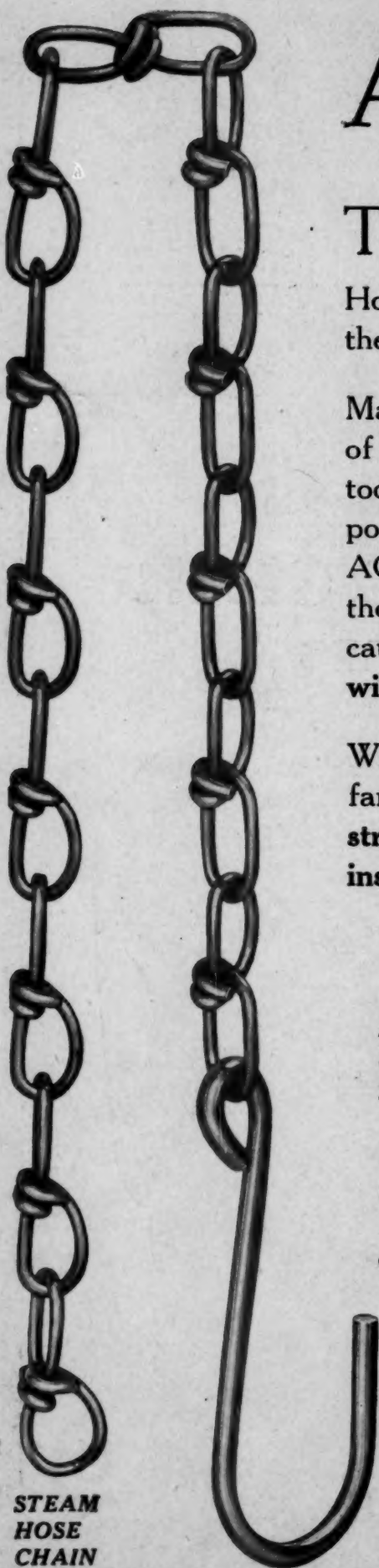
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DAILY EDITION

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WE GUARANTEE that of this issue, 15,000 copies were printed; that of these 15,000 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

If there have been doubts in any minds as to the health and vigor of Section III, Mechanical, attendance at yesterday's session would have effectively dispelled them. The seating accommodations of the Greek Temple were taxed to their capacity and standing room only was available.

Things Are Warming Up

The relations of the association to the railroads this year are such that this can indicate only one thing—interest in the work of the convention. This was fully borne out by the live and constructive value of the discussions on the more important reports.

A suggestion was made during the discussion of the report of the Committee on Autogenous and Electric Welding that the welding operators should be licensed. This suggestion was opposed on the ground that while a license might mean that a man could handle his arc properly,

Welding Practice

he might apply his weld to a bad casting that would fail at some point remote from the weld. Proper supervision, it was said, was to be recommended rather than the licensing of operators. Welding schools and methods for testing welds were also mentioned. Summed up, the discussion indicated a need for all these things. Schools are needed to make operators, a license or a test is necessary to insure that the welder can make a good weld, a testing method is desirable for insuring consistent results

from a welder and good supervision is essential for insuring proper applications of welding.

The report of the Committee on Repair Shop Layouts and the discussion which followed its presentation at yesterday's session of Section III,

Tools for Steel Car Work

Mechanical, drew attention to a promising field for development by shop equipment manufacturers. Most of the machine tools now used in steel car repair shops are designed primarily for boiler shop work, and as far as the need for special equipment has been supplied, it is with shop made devices. These tools are usually more or less crude in construction and seldom efficient in operation. Steel cars are rapidly increasing in numbers and have now been in service long enough so that the amount of heavy steel car repair work is increasing rapidly. The problem of providing for this work is now receiving consideration by many railroads, and the opportunity is ripe for a study of the requirements of the heavy repair shop and the development of tools adapted to the special conditions encountered in the fabrication of steel car repair parts.

The members of the Mechanical Section should be heartily commended for the active and intelligent interest shown in the discussion of the report of the Committee on Autogenous and Electric Welding. If it had not been necessary to leave time for the other reports the discussion would

Autogenous Welding

probably have lasted all morning. The various users do not get uniform results, and the result has been that certain practices are not considered advisable. The practice of welding parts the mechanical strength of which is responsible for safety is not generally recommended. This attitude is entirely justifiable and desirable, as safety is paramount. At the same time the members should not lose sight of the developments which have been and are being made. There are committees, societies, manufacturing companies and individual engineers giving their best efforts to the development of the art, and the railroads should not only keep in mind all the possibilities of welding, but should also give their assistance to those who are working to make autogenous welding thoroughly and completely dependable.

Many roads now are or soon will be considering electrification. When that question comes up the mechanical

The Crux of Electrification

department must be in a position to pass intelligently on the ultimate economy of electric operation. Electrification has not been adopted in this country as a means of saving money under every day operating conditions. For overcoming the smoke nuisance in tunnels or large cities, or for increasing track capacity it has proved useful. Before electrification can be adopted on a large scale the economy of electric operation must be definitely established. Extravagant claims are made regarding the saving in fuel and maintenance. Some advocates of electrification claim a reduction in fuel consumption as high as 66 per cent. Other estimates based on the power consumption of electrified divisions give figures as low as 25 per cent. Widely differing statements are also made concerning the comparative costs of maintaining steam and electric motive power. There is a question as to the extent to which electrification can be justified as a business proposition. Authentic comparative data on both fixed charges and operating costs and particularly

on power or fuel costs and equipment maintenance charges are lacking. The association could perform a valuable service for the railroads by arranging to have this subject studied by the committee during the coming year.

From a thorough inspection of the exhibits in the machinery section it would appear that the manufacturers of machine tools and hoists have left very little to be desired in the way of equipment required for the modern engine terminal. Of course, "there is many a slip 'twixt the cup and the lip" and the average mechanical superintendent may feel rather dubious over the possibility of getting any part of the splendid assortment of machinery into his engine terminals, but he will unquestionably go back with a more definite idea of just what he wants and that in itself is something. The manufacturers of machine tools and of cranes and hoists have left no stone unturned in providing for the needs of the improved engine terminals. Modernized engine terminals are a necessity. The manufacturers know that and have anticipated the requirements. Now it is up to the mechanical men to spread the propaganda for better terminals until the idea becomes ingrained in the minds of those responsible for the expenditures made to improve our railroads. Mechanical representatives of the railroads attending this convention would be derelict in their duty if they did not take particular note of some of the new shaper and small lathe models or if they overlooked the crank pin turning machine or other tools specially adapted to work in engine houses. These are all important features in the modernized engine terminal.

There is no question about the advisability of co-operative research; it has long been recognized in principle in the virtual acceptance by many roads of the results of tests conducted by the comparatively few railroads that have been in a position thoroughly and impartially to investigate the relative merits of various devices. The tests conducted at Altoona have been of immeasurable value to all American railroads. The mechanical associations have endorsed the principle of co-operative research in the co-operative investigation of important devices and methods. The establishment of co-operative research on a permanent basis would simply create a better foundation upon which to perpetuate a well-established idea in a workable form. The railroads have no trade secrets to guard from one another and the manufacturers have nothing to lose in the elimination of inefficient and ineffective devices from the market. The publication of data resulting from rigorous comparative tests would place the equipment business on a much more satisfactory basis and save individual railroads an immense amount of money lost on devices and materials that have ultimately proved deficient. The results of the comparative tests on draft gears and locomotive reverse gears initiated by the Inspection and Test Section of the Railroad Administration will afford an impetus to the movement which should now be crystallized into a definite plan for an organization supported by all progressive railroads which can proceed to make thorough and impartial tests on a large number of devices in every day use, the comparative values of which are little known.

No Stone Unturned

The Value of Co-Operative Research

The Committee on Repair Shop Layouts has before it one of the most important tasks confronting Section III,

An Impracticable Layout

Mechanical. The practical value of its work will be measured by the extent to which it is able to help the members in their efforts to get the right kind of shops on their individual roads. It is unfortunate in this connection that the repair shop layout presented in the committee's report did not receive some comment in the discussion. In round numbers, there are 2,400,000 railroad owned freight cars in the United States. Normally, about 4 per cent of these cars receive repairs of all classes daily, but of this 4 per cent only about one-tenth, or 10,000 cars, receive heavy repairs. The plan presented by the committee calls for an ultimate development capable of turning out 100 heavy repairs daily. Fully developed, such a plan is capable of taking care of an average of 2,000 miles of line which, with few exceptions, is far above the economic extent of territory to be served by one shop. The property required for the full development is over a mile long and a few hundred feet less than one-half mile wide for most of its length. Starting with the initial layout for 25 cars output daily, the layout provides for a future development quadrupling this output. For years after the completion of the initial unit a large part of the property required for the ultimate development must remain idle, thus placing a heavy carrying charge on the operation of the existing plant. Furthermore, changes in traffic development, the conditions in the labor market and increases in land values may completely change the economic aspects of the whole plan long before it reaches its full development. While the consideration of shop layouts is probably not the most important phase of the committee's work, it is one which should be developed in such a way as to be of maximum usefulness to the greatest number of the members, and it seems evident that to fulfill this requirement a less pretentious plan should be developed.

From the semi-annual convention of the Association of Railway Electrical Engineers, which was held yesterday

More "Pep" For the Electrical Men

at the Hotel Dennis, it is evident that the time is rapidly coming when some stimulus will have to be injected into the Association if it is to continue to be a factor in the electrical problems of the railroads. Out of the number of reports outlined in the program half only were presented. Inasmuch as most of the reports at this semi-annual meeting are in the nature of progress reports, it would seem that some progress, at least, could have been reported. We have already called attention to the fact that the electrical matters which came up for discussion in the sessions of the Mechanical Section did not receive the discussion that they merited. No such lack of discussion can be said to prevail in the meetings of the Association of Railway Electrical Engineers. The difficulty that lies here is not that the members fail to talk, but that they fritter away the time in the discussion of microscopic and unimportant details and miss entirely the big opportunities that exist all around them. For this reason, if for no other, it will be a very great step forward when the A. R. E. E. joins the A. R. A. New membership will be the certain result of such a union. Duplication of reports, such as exists to-day, will be eliminated. More enthusiasm, better discussion and bigger problems will be the inevitable result of this consolidation, and a larger and stronger organization will result, whose decisions in electrical matters will have the keynote of finality.

How many railroads regard the university graduate as a superfluous luxury and how many roads will appropriate

**Who Pays
His
Salary?**

money to give the college man the special training that will enable him to apply a well-trained mind to the highly specialized problem of transportation? How many railroads that have initiated special apprentice courses will be the first to eliminate this feature as the easiest way to pare down expenses in a pinch? Do these railroads flatter themselves that this is a money-saving program? Do they imagine that they are not paying a fancy price for university talent? It is safe to say that there is not a single device being exhibited at this convention in which the college man has not participated either in the design, manufacture or sale. When any of these devices are sold to the railroads, is not the college man's salary figured in the price, plus a liberal profit to the man who capitalized the college man's brains? Why should not the railroads capitalize the college man? Why should they not also maintain a strong technical staff? Do not necessarily construe this as a reflection on your own organization, Mr. Mechanical Superintendent; but consider what that organization may be 10 or 15 years from now if you have no college men in training on your road now. Who is going to get the best of the bargain when it comes to buying supplies—the organization with a strong technical organization, or the one without? The supply business is a cold-blooded game and the railroads are paying a pretty penny towards the salary of every college man that found the supply business more attractive than railroading.

Of all departmental relationships on the railroad, the most delicate, yet essential, is an intimate and cordial

**Mechanical Engineer—Purchases
and Stores**

understanding between the mechanical engineer and the storekeeper, or more broadly speaking, the mechanical department and the service of supply. The stores department is essentially a business institution; its objective is cost, and all that works to increase cost, such as interest on the money invested in material, depreciation, obsolescence and so on. The mechanical department is wholly technical in its function and the mechanical engineer has the opportunity to reconcile the technical with the business viewpoint. He should be capable of weighing the requirements of the mechanical department against the limitations imposed by market conditions and the financial resources of the railroad as interpreted by the purchasing agent, and can be of immeasurable assistance to the purchasing agent and service to his company by his ability to outline in a clear-cut, unbiased form the technical advantage of one machine tool compared with another, or of an alloy steel compared with less expensive material. The relationship calls for consideration on the part of the purchasing agent and breadth of view on the part of the mechanical engineer. It must be recognized that a single machine tool or a special alloy cannot always be insisted on, that alternate machines and materials must always be given consideration. One important railroad has gone so far as to entrust its mechanical engineering staff with responsibility for the final approval of all material requisitions originating in the shops, because it is thought that in this way overestimated shop requirements are discounted without the danger of curtailing shop output, resulting from requisitions being arbitrarily slashed by the stores department.

With the increased use of grinding machines in railway shop practice, the selection of proper wheels for different

**Efficient
Abrasive
Wheels**

classes of work becomes a question of more than passing importance. It has been demonstrated many times that grinding wheels affording the longest life are not necessarily the cheapest in the long run, but there is danger of forgetting this important fact. Mechanical department officials should make sure that their subordinates realize the importance of selecting grinding wheels of the proper grain and grade, not laying too much stress on the length of life of the wheels. It is evident that a wheel too hard for a given job will last longer than a softer wheel, but its cutting particles become dull, its efficiency is reduced, and the actual number of pieces ground is less than could be ground on a wheel of the proper grain and grade. In the ideal wheel the cutting particles are harder than the material ground and the binding material is just hard enough to hold the cutting particles until they become dull. Any softer bond would allow the wheel to wear away unnecessarily fast and a harder bond would hold the cutting particles until they were dull, with a resultant glazed or loaded wheel. Conditions under which grinding wheels are used vary so much that it is impossible to lay down an arbitrary rule covering wheel selection. The best method is to consult a grinding expert who can advise from long experience; but if such a man is not available or the conditions are new, it may be necessary to make preliminary tests before ordering a large number of wheels. These tests should be conducted carefully, over a considerable period of time, and by noting the relative wheel costs and reduction in weights for a given number of pieces ground, it is possible to determine which is the most efficient grinding wheel. Valuable information as to the best operating speed and conditions can also be obtained.

When all-steel cars were first introduced some railroad men anticipated that they would have an indefinitely long

**Non-Corrosive
Plates
for Cars**

life, and would be retired only on account of obsolescence. The rapid corrosion of the sheets in freight cars has been a disappointment to those who were optimistic concerning the life of steel cars. The marked reduction in maintenance costs that was expected has not developed; on the contrary, there is a question whether the expense of maintaining steel cars is any lower than for cars constructed partly of wood. The mistakes in estimating the life of steel cars was a natural one. The first metal plates used in cars were made from ore containing a low percentage of impurities and the material was manufactured by other processes than those now in use. But is there any reason why the sheets used in building cars should not be made to resist better the action of the elements? There are on the market materials which cost little more than ordinary sheets, but give a much longer life when exposed to rust. The life of the plate ordinarily determines the life of the car and prolonging the life of the sheets lengthens the service life of the equipment. If the price of a non-corrosive plate is 20 per cent higher than for the ordinary plate and this material amounts to 30 per cent of the total cost of the finished car the increase in the first cost by using such material would be only six per cent. It is not unreasonable to expect an increase of 50 per cent in the service life of cars built of rust-resisting metal, so the opportunity for economy is evident. The maintenance and depreciation of freight cars amounts to an enormous sum and such a promising field for saving should be thoroughly investigated.

Program for To-day

SECTION III—MECHANICAL

Discussion of Reports on:

Revision of Passenger Car Rules of Interchange	9.30 A. M. to 10.00 A. M.
Prices for Labor and Materials....	10.00 A. M. to 10.30 A. M.
Depreciation for Freight Cars....	10.30 A. M. to 11.00 A. M.
Arbitration	11.00 A. M. to 11.30 A. M.
Tank Cars	11.30 A. M. to 12.00 M.
Brake Shoe and Brake Beam Equipment	12.00 M. to 12.30 P. M.

SECTION VI—PURCHASES AND STORES

MORNING SESSION

Discussion of Reports of Committees	9.30 A. M. to 12.30 P. M.
Discussion of Reports of Committees	2.00 P. M. to 3.00 P. M.

AFTERNOON SESSION

Discussion of Report of Committee on Supply Train Operation. Moving Pictures of Supply Train on Southern Pacific	3.00 P. M. to 5.00 P. M.
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ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.
3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.
4.30 P. M.—Tea will be served in Entrance Hall.
9.30 P. M.—Grand Ball in Ball Room on Million Dollar Pier.

Railway Car

Manufacturers' Association

THE RAILWAY CAR MANUFACTURERS' ASSOCIATION will hold a luncheon to-day and a meeting at 1.30 P. M. (standard time) in the Forest Room of the Marlborough-Blenheim Hotel.

Use of Rolling Chairs

SHOULD any discourtesy be shown you by pushers of rolling chairs, which are provided by the R. S. M. A., take the number on the yellow card on the chair and report it promptly to some member of the Transportation Committee.

Registration Badges For Members Exhausted

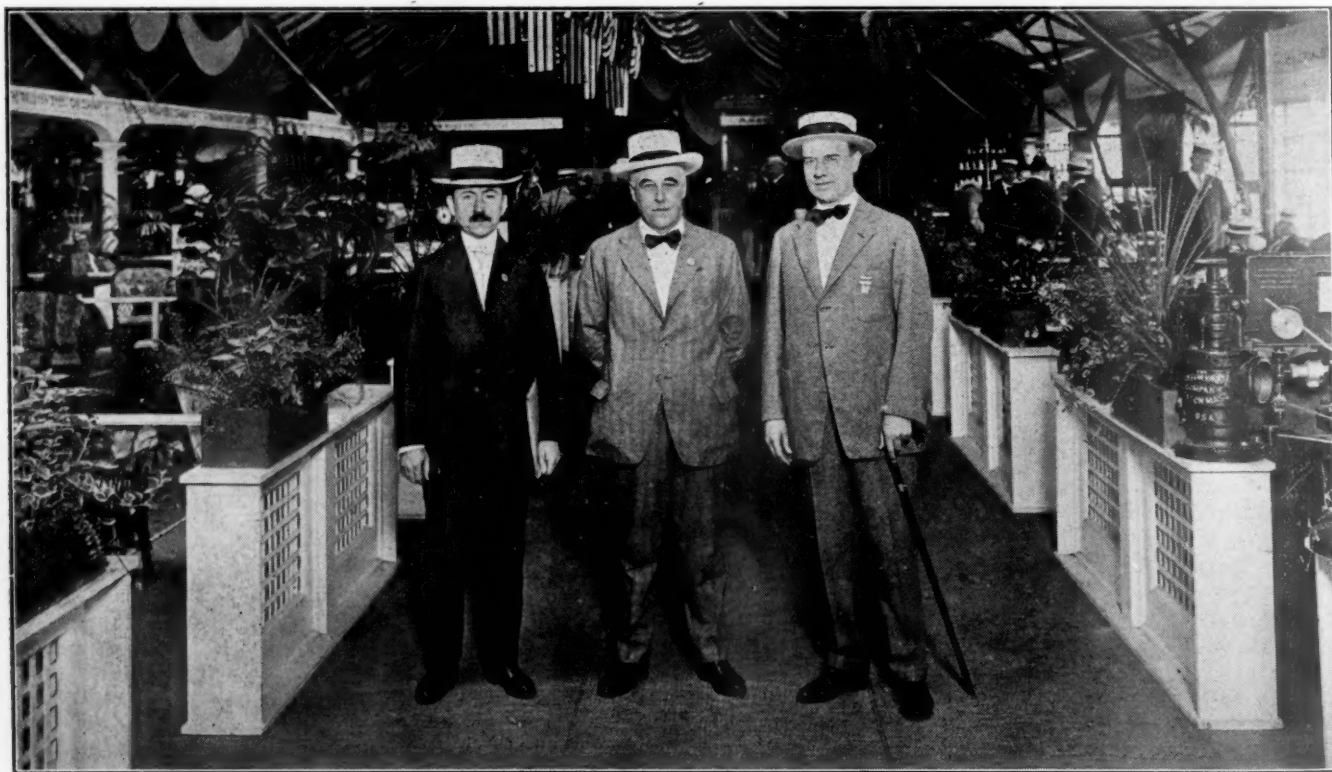
THE SUPPLY OF BADGES for members of Mechanical Section III, A. R. A., having become exhausted on account of the heavy registration, all members registering after noon yesterday were given special guests badges numbered from 3,000 to 3,099. They were, of course, registered as members.

Registration Figures

THE COMPARATIVE REGISTRATION FIGURES up to noon Monday for each year since 1911 are shown in the following table:

	1911	1912	1913	1914	1915	1916	1919	1920
Members, Section III, Mechanical	719	644	673	730	713	754	675	805
Members, Section VI, Purchases and Stores.....	...	...	...	...	...	...	...	406
Special Guests	832	584	680	554	507	702	1,278	687
Railroad Ladies	705	437	505	433	403	544	875	746
Supply Ladies	385	223	308	287	232	318	470	660
Supply Men	1,662	1,516	1,666	1,484	1,248	1,533	2,300	2,465
Total	4,303	3,404	3,837	3,488	3,103	3,871	5,648	5,769

Prior to, and including 1916, the figures for members contain duplications, as many officers belonged to and registered for both the M. C. B. and M. M. Associations.



President R. H. Aishton, American Railroad Association, Visiting the Exhibit; Secretary J. E. Fairbanks, A. R. A., at the Left; President George R Carr, R. S. M. A., at the Right

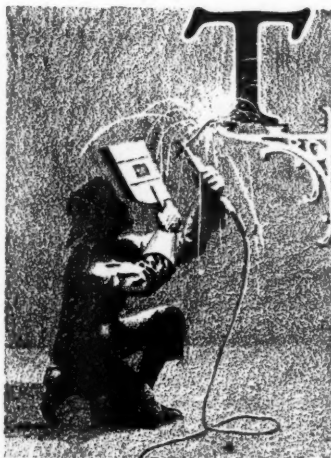


American Railroad Association—Section III—Mechanical

The Report of the Committee on Repair Shop Layouts, Brings Out a Lively Discussion

Chairman Tollerton called the meeting to order at 9.45 A. M.

Report of the Committee on Autogenous Welding



THE REPORT of the committee to the last convention was adopted by letter ballot and incorporated in the American Railroad Association Code of Rules (M. C. B.) governing the condition of, and repairs to, freight and passenger cars in the interchange of traffic.

There were three subjects referred back to the committee for further investigation and report, viz.:

- 1.—Building up flat spots on steel and steel tired wheels.
- 2.—Building up of worn collars at the journal ends of axle.
- 3.—Welding of fractures in couplers.

The committee has done considerable work on these subjects during the past year, but has not to date concluded its investigation and tests. In addition to the subjects left over last year, the committee is making a thorough study of the relative merits of autogenous gas and electric welding on the various parts of car and locomotive equipment.

The report was signed by J. T. Wallis (Chairman), Pennsylvania System; W. O. Thompson, New York Central; G. W. Rink, Central of New Jersey; A. M. McGill, Lehigh Valley; R. W. Schulze, St. Louis-San Francisco; Willard Kells, Atlantic Coast Line; H. T. Bentley, Chicago & North Western; Geo. Durham, Wheeling & Lake Erie; T. P. Madden, Missouri Pacific; H. B. MacFarland, Atchison, Topeka & Santa Fe, and G. M. Gray, Bessemer & Lake Erie.

Discussion

After reading the report, W. O. Thompson (N. Y. C.) said: "Your committee has received considerable criticism for the

conservative limits set on fractures allowed to be welded. For two or three years, I was of the same opinion as the critics, but my opinion was changed by seeing several very disastrous results, not of welding, but of soldering over the edges of fractures on different parts of cars that afterward failed, and caused serious accidents."

Prof. Alfred S. Kinsey (Stevens Institute of Tech.): As a director of the American Welding Society of New York City, I have asked the privilege of the floor to announce to you that a special committee has been appointed to take up the problem of welding as it affects organizations such as this. The committee also will co-operate with the Boiler Code Committee of the American Society of Mechanical Engineers to do everything possible to promote a mutual interest in successful autogenous welding. It has been generally supposed that the safe ending of boiler tubes was condemned by the American Society of Mechanical Engineers, but neither that society nor its boiler code committee ever took any such action so far as fire tubes are concerned. There is not anything on the records to show how they stand regarding the safe ending of fire tubes for locomotives. They do not approve of the safe ending of tubes in water tube boilers. The different societies are asked to form committees to co-operate with the welding society's committee, and the committee of the A. S. M. E., to determine how far we should go in allowing welds to be made in tension members and compression members; similarly in vessels under high pressure. The conference of all these committees should also discuss the question of licensing welders. The insurance companies are becoming very sensitive about the matter, because of the lack of control of welders. Shall we license welders? You men who are very much interested in autogenous welding in the railroad shops should have a voice in the decision of that question.

Autogenous welding has come to stay. The best engineering schools in the country are teaching autogenous welding. At Stevens Institute of Technology we are teaching every one of the 850 students passing through that school the four methods of welding, including the torch weld, the thermit weld, the elec-

tric weld, and the oxy-acetylene weld. They will never be welders, but they will know what a good weld is when they come to be assistant managers of shops, and have these welds to consider and to deal with. Night schools now are being conducted for the instruction of welders. During the war, a night school was started in New York, which is still continuing its work, because there is such a demand for gas welders.

It was my privilege to see in Mr. Pack's office in Washington a few months ago, the examples of poor welding he referred to in his report on boiler explosions. The trouble in those cases was that the men who made the welds either had no conscience, or no knowledge of how to make welds. They were the worst I ever saw, and it is not fair that they should be allowed to condemn the process of autogenous welding. I believe that Mr. Pack did not intend to condemn autogenous welding, but only wanted to call attention to the fact that the method, although a good one, was at the same time so important that it should be handled only by intelligent men; hence the thought of licensing welders, on my part.

At the meeting of the Master Boilermakers' Association a week ago, in Minneapolis, they voted to have a committee of five appointed, which was to be known as a conference committee, and which is to confer with these other committees. In a short time, we will probably have a meeting in Chicago or New York, and with all of these gentlemen sitting around the table, and officers like Mr. Pack, represented, men who are vitally interested in the subject, it is hoped that recommendations of great value will be formulated. We would appreciate very much having the co-operation of this organization. I understand you have a committee on welding, and presume the matter can be handled through that committee.

C. E. Fuller (U. P.): Am I to understand that the American Society of Mechanical Engineers is advocating the licensing of welders?

Mr. Kinsey: No, sir. I did not mean to imply that. I meant to say that some of us, in talking this over (I am a member of the A. S. M. E., but did not speak for that organization officially) are of the opinion that something should be done and must be done before long to put the stamp of approval on good welding, and the stamp of disapproval on careless welding. We must either license the welder or his boss to bring that about. In New York City they have had a requirement for a long time that welders must be licensed. You cannot perform a welding operation in that city without submitting to an examination at City Hall and paying \$5 for a license.

Mr. Fuller: I am a member of the American Society of Mechanical Engineers, and know something of their methods. The A. S. M. E. has a work to perform, and in performing that work, should we all be crucified because some of its members are representatives of insurance agencies and other interested parties? I think we had better consider this thing pretty carefully. We had our experience in the case of the boiler code. It is to be regretted that this committee did not present a report this year more in detail than it has done. We are not interested in some things, but we are interested in life and safety. There is nobody more interested in that phase of the question than the railroads. We are not doing this work haphazard, or for money. We are not being paid for the job. It makes all the difference in the world whether it is a blacksmith's shop on the outside, or whether it is one on the inside, and I for one want to protest against any action being taken here until the matter is carefully analyzed.

R. W. Bell (I. C.): We have approached the matter of welding very carefully, and want to go on record as protesting against the manner in which truck side frames have been welded.

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R. W. Bell (I. C.): We have approached the matter of welding very carefully, and we want to go on record as protesting against the manner in which truck side frames have been welded. We have had some very bad accidents because of the fact that they were simply soldered. I do not believe that you should have licensed welders. By selecting men carefully from among our various apprentices we can do all that is necessary to train efficient welders. By appointing the most intelligent men for this class of work we can get good results.

J. J. Tatum (B. & O.): Autogenous welding is a very deep subject. At the last convention we applied the emergency brakes and stopped perhaps too short. As Mr. Bell has said, there has been some very bad welding done; in fact there have been attempts to weld, and parts of cars have been passed as being welded that were not welded. According to the description which is given by some of our men they have the appearance of being whitewashed.

We can do more welding than we have decided should be done, but it must be done under the direction of some responsible official. It is not only necessary to consider the method of welding, but the part to be welded. The question many times is the character of the casting or forging that we are undertaking to weld. Is it worth welding? We may apply a good weld to a bad casting, and if we do we have gained nothing, and therefore, good supervision is necessary to get proper welding of the proper material.

F. W. Brazier (N. Y. C.): I want to bear out what Mr. Tatum and Mr. Fuller have said. You will notice that the committee asks for further time in which to make a study of the matter. We have some mighty poor welding, and it is better not to weld at all unless we can do it right; it is better to scrap the material rather than pay in accidents on the road. We have quite a bright set of men on the railroad, and by supervision and the work which this committee is going to do I feel confident we shall develop good men.

I. S. Downing (C. C. C. & St. L.): There is just one question in my mind on this matter of welding. It is a preferred job, and under the National Agreement I suppose we will have to bulletin the job.

Prof. Kinsey: I am afraid that you have lost track of what I said first—that I came to you as a member of the American Welding Society, not of the A. S. M. E. My motive this morning was entirely an unselfish one, prompted by the desire to obtain exactly what you men want. We have asked the A. S. M. E. to hold off with any more restrictions and to stop their discussion of this whole situation until the organizations can get its committee together, discuss the question and establish the limitations. If it is not best in your judgment to license welders, then we won't license welders, that is all.

E. Wanamaker (C. R. I. & P.): The American Welding Society has done some very good work along research lines. As I understand it, they are not proposing to set any particular limitations, but to try and co-ordinate the efforts of all organizations interested in autogenous welding, in order that each one may benefit from the findings of the other. So far as that goes, it might be well to have the railway organizations coöperate, and eventually they can make definite limitations, then the autogenous welding industry is certainly in its infancy, but we do know one thing: that the complications in the reduction of costs of maintenance and operation are going to force us to use many new processes. To use them intelligently, it will require intelligent investigation and research, which no doubt will be a continuous process for some years to come. I think that we should confine our work within certain definite limitations. After it has been proved and demonstrated that we can go farther afield, then the limit should be raised, and I think that is what this organization is going to do. At present we have excellent equipment available for thermit, gas and electric autogenous welding, but there are three prime requisites to be met in any or all of these three processes, if the welding is to be successful. Agreeing with the chairman of the committee, that the failures in autogenous welded parts have been in part due to the fact that they were not welded,

if we are going to get these welds done properly, we must make sure of the three prime requisites, which are: first, proper material for making welds; second, rules for using those materials; and third, intelligent application of the process in the design, to the various mechanical devices or articles that are to be welded. To secure that cooperation we need a man who is skilled in making the weld and blowing the metal into the weld.

We should all realize that in any autogenous weld the best we can do is to put good cast iron, cast steel, or alloy steel, into the casting. That being the case, certainly no effort should be spared to secure the proper materials for welding. If we are going to join high grade materials, whether it be in truck frames or boiler steel, we should first secure good materials to go into the weld. We should spare no expense or pains in an unceasing endeavor to thoroughly train our mechanics until they are capable of making first-class welds with a good high average of efficiency and factor of safety. Everybody in the mechanical department, having to do with the application of welding, should get down on the ground and study the application, so that it can be intelligently applied.

A. M. Simons (P. S. & N.): One of the most prolific sources of poor welds is their extended operations before the welders and those in charge have time thoroughly to master the process themselves. Their ambition to make a showing in the way of saving parts that have formerly been scrapped has frequently led men in the wrong direction, and caused them to use welding where it should not have been employed. We should proceed with that degree of caution which will insure confidence in the man that is doing the work; ability to supervise in the man who is responsible for the work in its last analysis, and also the ability to judge as to whether the materials should be welded or not. As to the licensing of welders, it is simply a term, meaning qualification. That is a matter to be decided upon by the different people interested in welding. The A. S. M. E. will, of course, treat this matter in the light as it appears to them, and you gentlemen should, I believe, do the same. But I bespeak

of this body, your cordial co-operation and support, and assistance in building up a society that can do you a good in this field. In doing that, you will also give yourselves added protection against what has been mentioned here to-day as unsatisfactory welds—welds of a character that cause you to look upon the problem with a degree of caution that in some instances has been taken as a condemnation. Certainly bad welding should be condemned, and good welding should be commended and extended, so far as it can be without endangering the character of the work that is being turned out.

C. F. Giles (L. & N.): Mr. Downing spoke of the requirements of the National Agreement, with respect to seniority governing the selection of men for doing this class of work, and created some levity, but in my opinion it is a very serious problem that we are dealing with in that respect, and I feel that this Association should go on record as advocating the establishment of the welding art as a separate trade, so that men can be trained for that class of work, and thus remove the embarrassment resulting from having it done by men belonging to the various crafts. It has caused a great deal of dissatisfaction ever since the present National Agreement became effective.

R. W. Bell (I. C.): If I understand the National Agreement correctly, there is nothing in that agreement which says that welding is a preferred job. In the matter of welding, you can select your men, and we do select our men as to merit and ability from the different crafts.

H. M. Curry (N. P.): I agree fully with what Mr. Giles says. On the Northern Pacific Mr. Bell could not put across his program that he just speaks of as being effective on the Illinois Central, and I hope that Mr. Giles' suggestion will be made effective. I am in hearty accord with him. There isn't any occasion for levity about the proposition. We are confronted with a mountain of trouble in connection with it, and my thought in making any remarks at all is, whether this is the proper time and place to consider a situation that must eventually be changed.

The motion that the paper be received and printed was put to a vote, and unanimously carried.

Report on Specifications and Tests for Materials



THE COMMITTEE SUBMITS its report covering the different subjects which were reviewed during the past year, with recommendations as shown under the respective exhibits. All references to page number relate to the 1917-18 Proceedings of the Master Mechanics' Association or to the 1918 Proceedings of the Master Car Builders' Association:

Exhibit A.—Specifications for Steel Tires, page 221, M. M., to be modified as shown in Exhibit A and adopted as Recommended Practice.

Exhibit B.—Specifications for Boiler and Fire Box Steel for Locomotive Equipment, page 244, M. M., to be modified as shown in Exhibit B and adopted as Standard.

Exhibit C.—Specifications for Lined Journal Bearings, page 1033, M. C. B., to be modified as shown in Exhibit C and adopted as Recommended Practice.

Exhibit D.—Specifications for Annealed and Unannealed Carbon Steel Axles, Shafts and other Forgings, page 254, M. M., to be modified as shown in Exhibit D and adopted as Recommended Practice.

Exhibit E.—Specifications for Solid Wrought Carbon Steel Wheels, page 239, M. M., to be modified as shown in Exhibit E and adopted as Standard.

Exhibit F.—Specifications for Bronze Bearings for Locomotives, page 304, M. M., to be modified as shown in Exhibit F and adopted as Recommended Practice.

Exhibit G.—Specifications for Carbon Steel Axles for Cars, Locomotive Tenders and Engine Trucks, page 229, M. M., to be modified as shown in Exhibit G and adopted as Standard.

Exhibit H.—Specifications for Solid Staybolt Iron, page 317, M. M., to be modified as shown in Exhibit H and adopted as Recommended Practice.

Exhibit I.—Specifications for Hollow Staybolt Iron—New Specification to be presented as shown in Exhibit I and adopted as Recommended Practice.

Exhibit J.—Specifications for Tender Tank Hose—New Specifications. To be presented as shown in Exhibit J and adopted as Recommended Practice.

Exhibit A—Tires, Steel—Locomotives and Cars

RECOMMENDED PRACTICE

PROPOSED FORM

1. Classes—(a) These specifications cover three classes of tires.
- (b) The purposes for which these classes are frequently used are as follows:

Class A, for driving tires for passenger locomotives;
Class B, for driving tires for freight locomotives and tires for locomotive-truck, tender-truck, trailer and car wheels, and miscellaneous service;
Class C, for driving tires for switching locomotives.

I—MANUFACTURE

2. Process—(a) The steel shall be made by the open-hearth or electric process.

II—CHEMICAL PROPERTIES AND TESTS

3. Chemical Composition—The steel shall conform to the following requirements as to chemical composition:

	Carbon:	Per cent
Class A	0.50—0.70
Class B	0.60—0.80
Class C	0.70—0.85
Manganese	0.50—0.75
Phosphorus	not over 0.05
Sulphur	not over 0.05
Silicon	0.15—0.35

4. Ladle Analyses—An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus, sulphur and silicon. This analysis shall be made on drillings taken at least $\frac{1}{4}$ in. beneath the surface of a test ingot taken during the

pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative and shall conform to the requirements specified in Section 3.

5. **Check Analyses**—Analyses to represent each melt may be made by the purchaser from turnings taken from a tire or from a tension test specimen, if the tension test is specified. The chemical composition thus determined shall conform to the requirements specified in Section 3.

III—PHYSICAL PROPERTIES AND TESTS

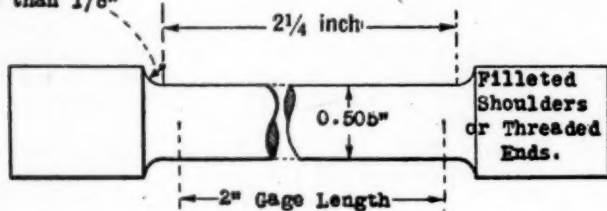
6. **Tension Tests**—If tension tests from representative bars in accordance with Section 7 are specified by the purchaser, the tensile properties shown shall conform to the following minimum requirements:

	Class A	Class B	Class C
Tensile strength, lb. per sq. in.	105,000	115,000	125,000
Elongation in 2 in., per cent.	12	10	8
Reduction of area, per cent.	16	14	12

7. **Tension-Test Specimens**—(a) The tension-test specimen representing each melt shall be taken from a test ingot taken during the pouring of the melt, and shall have received approximately the same amount of work as the tires which it represents.

(b) The specimens shall conform to the dimensions shown in Fig. 1. The ends shall be of a form to fit the holders of the testing machine in such a way that the load shall be axial.

Radius not less than 1/8"



8. **Number of Tests**—(a) If specified by the purchaser, one tension test shall be made from each melt.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any test specimen is less than that specified in Section 6 and any part of the fracture is more than 3/4 in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

9. **Retests**—If the results of the tension test for any melt do not conform to the requirements of Section 6, a retest may be made on a specimen cut from a tire of the same melt furnished at the expense of the manufacturer. This retest shall give results conforming to the requirements of Section 6.

IV—MATING

10. **Mating**—The tires shall be grouped as to outside diameters and shipped in sets.

V—PERMISSIBLE VARIATIONS IN DIMENSIONS

11. **Permissible Variations**—Tires may be furnished with all surfaces as rolled, and shall conform to the dimensions specified within the following permissible variations:

(a) The height of flange shall not be less, but may be 1/8 in. more than that specified.

(b) The thickness of flange shall not vary more than 1/16 in. from that specified.

(c) The radius of throat shall not vary more than 1/8 in. over nor more than 1/16 in. under that specified.

(d) The width of tire shall not vary more than 1/8 in. over nor more than 1/16 in. under that specified.

(e) The rough inside diameter shall not be more, but may be 1/8 in. less than that specified. When finished inside diameter only is specified, the rough diameter shall be from 1/8 in. to 1/4 in. less than this diameter.

(f) Unless otherwise specified, the outside diameter when 54 in. or under shall not be less, but may be 1/8 in. more than that specified; and when over 54 in. shall not vary more than 1/8 in. under nor more than 1/4 in. over that specified.

(g) The tires shall be furnished in sets and the variation in outside diameters in each set shall not exceed 1/8 in. for tires 33 in. or under in outside diameter, nor exceed 1/16 in. for tires over 33 in. in outside diameter.

(h) Tires shall not be out of round more than 1/8 in. for tires 33 in. or under in outside diameter, nor more than 1/16 in. for tires over 33 in. in outside diameter.

VI—FINISH

12. **Finish**—The tires shall be free from injurious defects and shall have a workmanlike finish.

VII—MARKING

13. **Marking**—The name or brand and serial number of the manufacturer shall be legibly stamped on the tire close to the inside edge, where they will not be removed at the last turning. Set numbers shall be legibly stenciled on each tire.

VIII—INSPECTION AND REJECTION

14. **Inspection**—The inspector representing the purchaser shall have free entry at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the tires ordered. The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the tires are being furnished in accordance with these specifications. Unless otherwise specified, all tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment.

15. **Rejections**—Tires which show injurious defects while being finished by the purchaser will be rejected, and the manufacturer shall be notified.

16. **Rehearing**—Samples tested in accordance with Section 5, which represent rejected tires, shall be preserved for two weeks from the date of the test report.

Exhibit B—Steel, Boiler and Fire-Box, for Locomotive Equipment

STANDARD

PROPOSED FORM

1. **Scope**—These specification cover two grades of steel for boilers for locomotives, namely: flange and fire-box.

I—MANUFACTURE

2. **Process**—Unchanged.

II—CHEMICAL PROPERTIES AND TESTS

3. **Chemical Compositions**—Manganese range for fire-box steel changed from .30—.50 per cent to .30—.60 per cent.

4. **Ladle Analyses**—No essential change.

5. **Check Analyses**—No essential change.

III—PHYSICAL PROPERTIES AND TESTS

6. **Tension Tests**—Unchanged.

7. **Modification in Elongation**—(a) For material over 3/4 in. in thickness, a deduction of 0.5 from the percentage of elongation specified in Section 6 (a) shall be made for each increase of 1/4 in. in thickness above 3/4 in.

(b) For material 3/4 in. or under in thickness, the elongation shall be measured on a gage length of 24 times the thickness of the specimen.

8. **Bend Test**—The test specimen shall bend cold through 180 deg. without cracking on the outside of the bent portion, as follows: For material 1 in. or under in thickness, around a pin the diameter of which is equal to the thickness of the specimen; and for material over 1 in. in thickness, around a pin the diameter of which is equal to twice the thickness of the specimen.

9. **Homogeneity Test**—Unchanged, but specified for fire-box steel.

10. **Test Specimen**—(a) Tension test specimens shall be taken longitudinally from the bottom of the finished rolled material, and bend test specimens shall be taken transversely from the middle of the top of the finished rolled material. The longitudinal test specimen shall be taken in the direction of the longitudinal axis of the ingot, and the transverse specimens at right angles to that axis.

(b) Tension and bend test specimens shall be of the full thickness of material as rolled, and shall be machined to the form and dimensions shown in Fig. 1 (unchanged), except that bend test specimens may be machined with both edges parallel.

11. **Number of Tests**—(a) One tension and one bend test shall be made from each plate as rolled. In addition, one homogeneity test shall be made from each fire-box plate as rolled.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any tension test specimen is less than that specified in Section 6 (a) and any part of the fracture is outside the middle third of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

IV—PERMISSIBLE VARIATIONS IN WEIGHT AND THICKNESS

12. **Gage**—Unchanged.

13. **Weight**—Unchanged.

V—FINISH

14. **Finish**—Unchanged.

VI—MARKING

15. **Marking**—(a) The name or brand of the manufacturer, melt or slab number, grade, and the lowest tensile strength for its grade specified in Section 6 (a), shall be legibly stamped on each plate. The melt or slab number shall be legibly stamped on each test specimen.

(b) When specified on the order, plates shall be match-marked as defined in paragraph (c) so that the test specimens representing them may be identified. When more than one plate is sheared from a single slab or ingot each shall be match-marked so that they may all be identified with the test specimen representing them.

(c) Each match mark shall consist of two overlapping circles each not less than 1 1/2 in. in diameter, placed upon the shear lines, and made by separate impressions of a single-circle steel die.

(d) Match-marked coupons shall match with the sheets represented and only those which match properly shall be accepted.

VII—INSPECTION AND REJECTION

16. **Inspection**—No essential change.

17. **Rejection**—Unchanged.

18. **Rehearing**—Samples tested in accordance with Section 5, which represent rejected material, shall be preserved for two weeks from the date of test report.

Exhibit C—Bearings, Journal, Lined

RECOMMENDED PRACTICE

PROPOSED FORM

1. **Scope**—These specifications cover journal bearings for use on locomotive tenders, passenger train cars and freight train cars.

2. **Manufacture**—Before lining, the brass backs shall be bored and thoroughly tinned in accordance with the best standard practice. The thickness of linings which is desired shall be specified in the order. If it is not specified, linings one-quarter inch thick shall be furnished. After lining, the ends of the bearings shall be made smooth by scraping, filing or machining. They must not be ground or rubbed with abrasive materials.

I—CHEMICAL PROPERTIES AND TESTS

3. **Composition of Back**—

	PER CENT	
	A	B
Lead	16 to 24	24 to 30
Tin	5 to 7	4 (min.)
Total of other impurities, maximum.....	4	3
Copper	67 to 77	63 to 72

Within the ranges permitted, the tin and lead should vary, if at all, in opposite directions, the tin being increased for the lower percentages of lead.

The owner of the equipment on which the bearings are to be used shall specify which class of metal is desired. If he does not do so, metal of Class A shall be furnished.

4. Composition of Lining—

	PER CENT	
	C	D
Tin	3 to 5	0.5 to 1.5
Antimony	8 to 10	.....
Antimony plus tin	12 to 14	3 to 5
Arsenic, maximum	0.2	.....
Total of other impurities, maximum	0.5	0.5
Lead	85 to 88	94 to 96

Metal of Class C is for linings of a nominal thickness over $\frac{1}{8}$ in. Metal of Class D is for linings of $\frac{1}{8}$ in. or less in nominal thickness. This classification is independent of the composition of the back. Either composition of the back may be used with the composition of lining metal specified for the thickness of lining which is ordered.

5. Analysis—The sample for chemical analysis of the shell shall consist of a thorough mixture of equal quantities of fine drillings taken at three points on the bearing, surface metal being discarded. The sample for analysis of the lining shall be taken by scraping the lining, after removing surface metal.

II—PHYSICAL PROPERTIES AND TESTS

6. Tests—The finished casting representing a lot for acceptance shall be broken, either longitudinally or transversely, or both, in order to ascertain the uniformity of the grain of the metal. When this fracture shows separation or imperfect mixing of component parts or cross or dirt spots, the lot shall be rejected.

7. Number of Tests—Unchanged.

III—PERMISSIBLE VARIATIONS

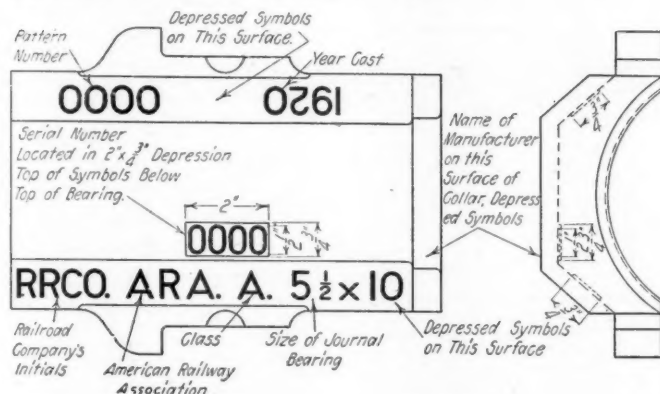
8. Gaging—All bearings shall conform to the latest standards of the Mechanical Section of the American Railroad Association, with respect to form and dimensions and variations therefrom.

IV—FINISH

9. Finish—Unchanged.

V—MARKING

10. Marking—Each lot of 300 or less shall bear a serial number, commencing with one at the beginning of the year and continuing consecutively until the end of the year, at each manufacturer's plant. The bearings shall be cast with marks as shown in Fig. 1.



VI—INSPECTION AND REJECTION

11. Inspection—Unchanged, except last sentence, which reads: "Such tests shall show the material to conform to Sections 3, 4, 5 and 6."

12. Rejection—Unchanged.

13. Reheating—Samples tested in accordance with Section 11-(b), which represent rejected material, shall be preserved for 14 days from date of test report.

Exhibit D—Axles, Shafts and Other Forgings, Annealed and Unannealed

RECOMMENDED PRACTICE

PROPOSED FORM

1. Scope—(a) These specifications cover two classes of forgings, distinguished, respectively, as "Medium" and "Mild." Medium forgings are intended for the important large forged parts of locomotives, such as axles, rods, rod straps, pins, guides, etc. Mild forgings are to be used only where so ordered, for parts of minor importance, and those which are to be case-hardened, etc.

(b) The manufacturer may, at his option, furnish annealed forgings when unannealed forgings are specified by the purchaser, provided they conform to the requirements specified for unannealed forgings.

(c) Unless otherwise specified, annealed material shall be furnished for medium forgings. All axles over 6 in. in diameter at center shall be annealed. Mild forgings may be furnished unannealed unless otherwise specified.

I—MANUFACTURE

2. Process—The steel may be made by the open-hearth or electric process.

3. Prolongation for Test—The manufacturer and the purchaser shall agree upon forging on which a prolongation for test purposes shall be provided.

4. Annealing—(a) For annealing, the forgings shall be allowed to become cold after forging. They shall then be uniformly reheated to the proper temperature to refine the grain (a group thus reheated being known as an annealing charge) and allowed to cool uniformly.

(b) Material ordered to these specifications must under no circumstances be quenched.

II—CHEMICAL PROPERTIES AND TESTS

5. Chemical Composition—The steel shall conform to the following requirements as to chemical composition:

	Medium forgings	Mild forgings
Carbon	0.38—0.52	0.08—0.18 per cent
Manganese	0.40—0.70	Max. 0.55 per cent
Phosphorus	Max. 0.05	Max. 0.05 per cent
Sulphur	Max. 0.05	Max. 0.05 per cent

6. Ladle Analyses—An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus, sulphur and silicon. This analysis shall be made on drillings taken at least $\frac{1}{4}$ in. beneath the surface of a test ingot taken during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative and shall conform to the requirements specified in Section 5.

7. Check Analyses—Analyses may be made by the purchaser from a forging representing each melt, which shall conform to the requirements specified in Section 5. Drillings for analysis may be taken from the forging or from a full-sized prolongation of the same, at any point midway between the center and surface, or turnings may be taken from a test specimen.

III—PHYSICAL PROPERTIES AND TESTS

8. Tension Tests—(a) Medium forgings shall conform to the following minimum requirements as to tensile properties:

For forgings whose maximum outside diameter or over all thickness is not over 12 in. when unannealed and not over 20 in. when annealed.

UNANNEALED		Elongation in 2 in., per cent		Reduction of area, per cent	
Size, outside diameter or over all thickness	Tens. str., lb. per sq. in.	Yield point, lb. per sq. in.	Inverse ratio	Not under	Inverse ratio
Not over 8 in.	75 000	0.5 tens. str.	1 600 000	18	2 200 000
Over 8 to 12 in., inclusive	75 000	0.5 tens. str.	1 500 000	17	2 000 000
ANNEALED		Elongation in 2 in., per cent		Reduction of area, per cent	
Not over 8 in.	80 000	0.5 tens. str.	1 800 000	20	2 800 000
Over 8 to 12 in., inclusive	80 000	0.5 tens. str.	1 725 000	19	2 640 000
Over 12 to 20 in., inclusive	80 000	0.5 tens. str.	1 650 000	18	2 400 000

(b) The classification by size of the forging shall be determined by the specified diameter or thickness which governs the size of the prolongation from which the test specimen is taken.

(c) Mild forgings of all sizes shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	47 000
Yield point	0.5 tensile strength
Elongation in 2 in., per cent	30
Reduction of area, per cent	45

(d) The yield point shall be determined by the drop of the beam of the testing machine, the speed of the cross head of the machine not exceeding $\frac{1}{4}$ in. per minute. For the determination of tensile strength the speed shall not exceed $1\frac{1}{2}$ in. per minute.

(e) Tests of annealed forgings shall be made only after final annealing.

9. Tension Test Specimens—No essential change.

10. Number of Tests—Unchanged except:

(c) Sections 9 and 10 changed to Sections 8 and 9.

(e) Section 9 (a) changed to Section 8.

11. Retest—(a) Reference to Section 11 changed to Section 10.

(b) When annealed forgings are specified, if the fracture of any tension test specimen shows over 15 per cent crystalline, a second test shall be made. If the fracture of the second specimen shows over 15 per cent crystalline, the forgings represented by such specimens shall be reannealed.

IV—WORKMANSHIP AND FINISH

12. Workmanship—The forgings shall conform to the size and shapes specified by the purchaser. When centered, 60 deg. centers shall be used with large diameter or countersink not less than $\frac{1}{8}$ in., and with clearance drilled $\frac{1}{8}$ in. deep.

13. Finish—Unchanged.

V—MARKING

14. Marking—Unchanged.

VI—INSPECTION AND REJECTION

15. Inspection—Unchanged except for the elimination of paragraph (c).

16. Rejection—Forgings which show injurious defects while being finished by the purchaser will be rejected and the manufacturer shall be notified.

17. Reheating—Samples tested in accordance with Section 15 (b), which represent rejected forgings, shall be preserved for two weeks from the date of test report.

Exhibit E—Wheels, Solid Wrought Carbon Steel

STANDARD

PROPOSED FORM

1. Scope—These specifications cover all solid wrought carbon steel wheels for locomotives and cars.

I—MANUFACTURE

2. Process—The steel shall be made by the open-hearth or electric process.

II—CHEMICAL PROPERTIES AND TESTS

3. Chemical Composition—Unchanged.

4. Ladle Analyses—No essential change.

5. Check Analyses—No essential change.

III—TOLERANCES

6. Tolerances—(a) Wheels should be furnished rough-bored and with faced hubs, and have a contour of tread and flange as rolled or machined according to Figure Sheet A. R. A. 16A. They should conform to dimensions specified within the following tolerances: (Unchanged except as shown below.)

(h) The limit of wear groove to be located as shown on Sheet A. R. A. 16A.

(i) The hub may be either 10 in. or 11 in. in diameter, as specified, for car and tender wheels and outside hub of engine-truck wheels and 13½ in. and 15 in. in diameter for inside hubs on engine-truck wheels. Maximum variation of ¼ in. below. The thickness of the wall of the finished bored hub shall not vary more than ⅜ in. at any two points on the same wheel.

(l) The depression of the hub must be made so that the distance from the outside face of the hub to the line "AB" shall not exceed 1½ in. for wheels used on 5½ in. axles and under, and 1⅞ in. for wheels used on 6 by 11 in. axles, as shown on Sheets A. R. A. 25, 25A, and 25B. For engine-truck wheels the distance from the inside face of the hub to the line "AB" shall not be less than 3⅞ in.

(t) Gages and tapes used shall be A. R. A. Standard or Recommended Practice, as follows:

Wheel circumference measure	A. R. A. Sheet 16-B.
Maximum flange thickness gage	A. R. A. Sheet 16.
Minimum flange thickness gage	A. R. A. Sheet 16.
Rotundity gage	A. R. A. Sheet 16-A.
Gage for measuring service metal	A. R. A. Sheet C-1.
Plane gage	A. R. A. Sheet 16-A.

IV—BRANDING

7. Branding—The name or brand of the manufacturer, date and manufacturer's serial number shall be legibly stamped on each wheel, also purchaser's initials and serial number, if specified, in accordance with Sheet A. R. A. C2. The tape size shall be legibly marked on each wheel.

V—FINISH

8. Finish—Unchanged.

VI—INSPECTION

9. Inspection—(a), (b) and (c) unchanged.

(d) Wheels which show injurious defects while being finished by the purchaser shall be rejected, and manufacturer promptly notified.

(e) Samples tested in accordance with Section 5, which represent rejected wheels, shall be preserved for two weeks from the date of test report.

(f) The initials and serial number of the purchaser, referred to in Section 7, shall be obliterated from all rejected wheels in the presence of the inspector.

Exhibit F—Bearings, Bronze, for Locomotives

RECOMMENDED PRACTICE

PROPOSED FORM

1. Scope—Unchanged.

I—CHEMICAL PROPERTIES AND TESTS

2. Chemical Composition—The material shall conform to the following requirements as to chemical composition:

	Phosphor bronze	Hard bronze	Medium bronze	Soft bronze
Copper, not over, per cent.	82	80	77	69
Tin, not less, per cent.	8	8	7	4
Phosphorus, per cent.	0.4—1	0—0.1	0.2—0.6	.....
Lead, per cent.	8—13	10—15	14—20	26—33
Other elements and impurities, not over, per cent.	1	1	1	1

3. Analyses—Unchanged.

II—PHYSICAL PROPERTIES AND TESTS

4. Tests—The casting representing a lot for acceptance shall be broken through the center and parallel with the longitudinal axis of the bearing in order to ascertain the uniformity of the grain of the metal. When this fracture shows separation or imperfect mixing of component parts, or dross or dirt spots, the lot shall be rejected.

5. Number of Tests—One sample may be taken for chemical analyses from each lot of 5,000 lb. or less. One casting may be taken for fracture test from each lot of 100 castings or less.

III—PERMISSIBLE VARIATION

6. Gaging—Unchanged.

IV—FINISH

7. Finish—Unchanged.

V—MARKING

8. Marking—Each lot of 100 castings or fraction thereof shall bear a serial number, commencing with 1 at the beginning of the year and continuing consecutively until the end of the year. All bearings shall also have cast on them the manufacturer's initials or trade-mark, the pattern number, and such other marks as are shown on the drawings.

VI—INSPECTION AND REJECTION

9. Inspection—Paragraph (c) eliminated.

10. Rejection—Material which, subsequent to above tests at the mills or elsewhere, and its acceptance, shows any defects shall be rejected and shall be replaced at the expense of the manufacturer.

11. Rehearing—Samples tested in accordance with Section 9-(b), which represent rejected material, shall be held for fourteen days from date of test report.

Exhibit G—Axles, Carbon Steel, for Cars, Locomotive Tenders and Engine Trucks

STANDARD

PROPOSED FORM

1. Scope—(a) These specifications cover axles up to and including those 6½ in. in diameter at the center. Axles over 6½ in. in diameter at the center shall be purchased under the latest issue of the Specifications for Annealed Carbon Steel Axles, or Specifications for Quenched and Tempered Alloy Steel Axles.

(b) Axles up to and including those 6 in. in diameter at the center may be unannealed, but all axles over 6 in. in diameter at the center shall be annealed.

I—MANUFACTURE

2. Process—(a) Steel shall be made by the open-hearth or electric process.

(b) All axles over 6 in. in diameter at the center shall be annealed by allowing the finished forgings to become cold after forging, then uniformly reheating to the proper temperature to refine the grain, and allowing to cool uniformly.

II—CHEMICAL PROPERTIES AND TESTS

3. Chemical Composition—The steel shall conform to the following requirements as to chemical composition:

Carbon, per cent.	0.38-0.52
Manganese, per cent.	0.40-0.70
Phosphorus, not over, per cent.	0.05
Sulphur, not over, per cent.	0.05

4. Ladle Analyses—No essential change.

5. Check Analyses—Analyses may be made by the purchaser from one axle representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 3. The drillings for these analyses shall be from one end of test axle at any point midway between the center and surface, using a ⅜ in. drill.

III—PHYSICAL PROPERTIES AND TESTS

6. Drop Tests—(a) The test axle shall be so placed on supports 3 ft. apart that the tup will strike it midway between the ends. It shall stand without fracture five blows from a tup of 2,240 lb. falling from a height H, such that H in feet equals the square of the diameter of the axle at the center in inches, $H = d^2$. The axle shall be turned through 180 deg. after the first and third blows.

(b) The permanent set produced by the first blow shall not exceed that given by the following formulas, in which L = length of axle in inches and d = diameter of axle at center in inches.

For axles over 65 in. in length:

$$\frac{L}{1.9d} - \frac{d}{2} + \frac{1}{2} \text{ in.} \dots \dots \dots (1)$$

For axles 65 in. or under in length:

$$\frac{L}{1.9d} - \frac{d}{2} + 1 \text{ in.} \dots \dots \dots (2)$$

(c) The American Railway Association has adopted five standard sizes of axles, the requirements for which, based on the above formula (1), are given in the following table:

Size of journal, in.	Diameter of axle at center, in.	Length of axle, in.	Height of drop, in.	Number of blows	Maximum permanent set, in.
3¾ by 7	4¼	83¾	18	5	8¾
4¼ by 8	4¾	84¾	22½	5	7½
5 by 9	5¾	86¾	29	5	6¾
5½ by 10	5¾	88¾	34½	5	5¾
6 by 11	6¾	90¾	41½	5	4¾

(d) The maximum permanent set is the difference between the distance from a straight edge to the middle point of the axle, measured before the first blow, and the distance measured in the same manner after the blow. The straight edge shall rest only on the collars or the ends of the axle.

(e) The temperature of the test axle shall be between 40° and 120° F.

7. Drop-test Machine—The anvil of the drop-test machine shall be supported on 12 springs, as shown on the A. R. A. drawings, and shall be free to move in a vertical direction, and shall weigh 17,500 lb. The radii of the striking face of the tup and of the supports shall be 5 in.

8. Number of Tests—One drop test shall be made from each melt. The weight of axles offered from any one melt shall not be less than the equivalent of the weight of thirty 6 x 11 in. axles.

IV—WORKMANSHIP AND FINISH

9. Workmanship—Unchanged except for the addition of the following paragraph:

(b) Freight equipment axles, unless otherwise specified, shall have the wheel seats and journals rough turned. Engine truck and passenger car axles to be rough turned all over, except collars. The rough turning to be done with a tool of such shape that the surface is free from ridges and chatter marks.

10. Finish—Unchanged.

V—PERMISSIBLE VARIATIONS AND WEIGHTS

11. Permissible Variation—The axles shall conform in size and shape to the standard A. R. A. drawings. Length shall not be less than shown and not more than ¼ in. over. Diameters shall not be less than those shown or more than ⅛ in. over on smooth forged axles, or ⅜ in. over on rough turned portions.

VI—MARKING AND STORING

12. Marking—Unchanged.

13. Storing—Unchanged.

VII—INSPECTION AND REJECTION

14. Inspection—Paragraph (d) eliminated.

15. Rejection—Unchanged.

16. Rehearing—Samples tested in accordance with Section 5, which represent rejected material, shall be preserved fourteen days from date of test report.

Exhibit H—Staybolt Iron, Solid—Locomotives

RECOMMENDED PRACTICE

PROPOSED FORM

1. Scope—Unchanged.

I—MANUFACTURE

2. Process—Unchanged.

3. Definition of Terms—Unchanged.

II—CHEMICAL PROPERTIES AND TESTS

4. Chemical Composition—Phosphorus requirement eliminated.

III—PHYSICAL PROPERTIES AND TESTS

5. Tension Tests—Unchanged.
 6. Bend Tests—(a) and (b) unchanged.
 (c) Bend tests may be made by pressure or by blows.
 7. Etch Tests—Unchanged.
 8. Test Specimens—Unchanged.
 9. Number of Tests—Unchanged.

IV—PERMISSIBLE VARIATIONS IN GAGE

10. Permissible Variations—Unchanged.

V—FINISH

11. Finish—Unchanged.

VI—MARKING

12. Marking—Unchanged.

VII—INSPECTION AND REJECTION

13. Inspection—Paragraph (c) eliminated.
 14. Rejection—Unchanged.
 15. Rehearing—Samples tested in accordance with Section 13-(b), which represents rejected material, shall be held for fourteen days from date of test report.

Exhibit I—Staybolt Iron, Hollow—Locomotive

RECOMMENDED PRACTICE

PROPOSED FORM.

I—MANUFACTURE

1. Process—The iron shall be rolled from a bloom, slab pile or box pile, made wholly from reworked puddled pig iron or reworked knobbed charcoal iron. The puddle mixtures and the component parts of the bloom, slab pile, or box pile, shall be free from any admixtures of iron scrap or steel.
 2. Definition of Terms—(a) Bloom is a solid mass of iron that has been hammered into a convenient size for rolling.
 (b) Slab Pile—A slab pile is built up wholly of flat bars of iron of the full length of the pile.
 (c) Box Pile—A box pile is a pile the sides, top and bottom of which are formed by four flat bars and the interior of which consists of a number of small bars the full length of the pile.
 (d) Iron Scrap—This term applies only to foreign or bought scrap and does not include local mill products free from foreign or bought scrap.

II—CHEMICAL PROPERTIES AND TESTS

3. Chemical Composition—At the option of the purchaser and when so specified, chemical analysis shall be made, and drillings taken from tension test specimens shall conform to the following requirements as to chemical composition:
 Manganese, not over 0.10 per cent.
 4. Check Analyses—(a) An analysis may be made by the purchaser from a broken tension test specimen representing each lot as specified in Section 10 (a). The chemical composition thus determined shall conform to the requirements specified in Section 3.
 (b) Drillings for chemical analysis shall be so taken as to represent the entire cross section of the specimen.

III—PHYSICAL PROPERTIES AND TESTS

5. Tension Tests—(a) The iron shall conform to the following requirements as to tensile properties:

Tensile strength, lb. per sq. in.	47,000-52,000
Yield point, minimum lb. per sq. in.	0.55 tensile strength
Elongation in 8 in., minimum per cent.	28
Reduction of area, minimum per cent.	42

 (b) The yield point shall be determined by the drop of the beam of the testing machine. The speed of the cross head of the machine shall not exceed $\frac{3}{4}$ in. per minute. For the tensile strength the speed shall not exceed 4 in. per minute.
 6. Cold-bend Tests—(a) The test specimen shall bend cold through 180 deg. flat on itself in both directions without fracture on the outside of the bent portion.
 (b) Bend tests may be made by pressure or by blows.
 7. Splitting Test—A piece not less than 3 inches long shall be split open from end to end by driving a drift through the hole. The structure thus exhibited shall be free from signs of imperfect welding and the presence of slag or scale.
 8. Etch Tests—The cross section of the test specimen shall be ground or polished, and etched for a sufficient period to develop the structure. This test shall show the material to have been rolled from a bloom, slab pile, or box pile, and to be free from steel.
 9. Test Specimens—All test specimens shall be of the full section of material as rolled.
 10. Number of Tests—(a) Bars of each size shall be sorted into lots of 100 each. Two bars shall be selected at random from each lot or fraction thereof and tested as specified in Sections 5, 6 and 7, but only one of these bars shall be tested as specified in Sections 3 and 8.
 (b) If any test specimen from either of the bars originally selected to represent a lot of material contains surface defects not visible before testing but visible after testing, or if a tension test specimen breaks outside the middle third of the gage length, the individual bar shall be rejected, and one retest from a different bar will be allowed.

IV—PERMISSIBLE VARIATIONS IN GAGE

11. Permissible Variations—The bars shall be truly round within 0.01 in., and shall not vary more than 0.01 in. above nor more than 0.005 in. below the specified size.
 *A solution of two parts water, one part concentrated hydrochloric acid, and one part concentrated sulphuric acid is recommended for the etch test.

V—FINISH

12. Finish—The bars shall be smoothly rolled and free from alivers, depressions, seams, crop ends, and evidences of being burnt. The hole shall be as nearly axial and as nearly round as the best manufacturing practice permits, and shall have an area equivalent to that of a round hole $\frac{1}{4}$ in. in diameter. The hole shall be free from slag and other obstructions.

VI—MARKING

13. Marking—The bars shall be stamped or marked with the name or brand of the manufacturer.

VII—INSPECTION AND REJECTION

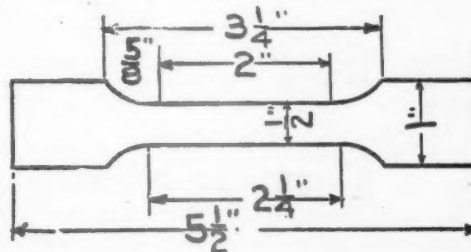
14. Inspection—(a) The inspector representing the purchaser shall have free entry at all times, while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. Tests and inspection at the place of manufacture shall be made prior to shipment.
 (b) The purchaser may make the tests to govern the acceptance or rejection of material in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.
 15. Rejection—(a) If either of the test bars selected to represent a lot does not conform to the requirements specified in Sections 3, 5, 6, 7 or 8, the lot will be rejected.
 (b) Bars which will not take a clean, sharp thread, with dies in fair condition, or which develop defects in forging or machining, will be rejected, and the manufacturer shall be notified.
 16. Rehearing—Samples tested in accordance with Section 4-(a), which represent rejected material, shall be held for fourteen days from the date of test report.

Exhibit J—Tender Tank Hose

PROPOSED FORM

1. Scope—This specification covers non-collapsible corrugated suction hose for connections between locomotives and tender tanks.
 2. Classification—These specifications cover two classes of hose, known as "A" and "B." Class "A" shall meet all the requirements of the specifications, with the exception of the requirements for the digester test.
 3. Construction—(a) The hose shall be made up of the following parts, assembled in the order named:
 Inner tube of rubber.
 Two piles of frictioned cotton duck.
 Helical reinforcement of wire.
 Layer of rubber 0.07 in. thick.
 Two piles of frictioned cotton duck.
 Outer cover of rubber.

- (b) The inner tube shall not be less than 0.07 in. thick, of a composition of rubber adapted to resist the action of hot water. It shall be smooth, uniform in quality and thickness and free from injurious defects.
 (c) The cotton duck shall weigh not less than 18 ounces per lineal yard for material 40-in. wide. It shall be evenly woven from a high-grade cotton and shall be free from mechanical defects. It shall be well frictioned with rubber on both sides, and in addition shall have a distinct layer of rubber on both sides, readily visible when the finished hose is cut open. The frictioned fabric shall be applied on the bias, with the edges lapped at least $\frac{1}{2}$ in., but not sewed. The fabric shall be of such quality and so applied as to produce a hose of maximum flexibility consistent with meeting the requirements of this specification.
 (d) The helical reinforcement shall be of thoroughly galvanized No. 9 B. W. G. (0.148 in.) spring steel wire. It shall be wound with not over 1-in. pitch throughout the length of the hose, up to a point distant from each end as shown on the drawings, or order, or for a distance equal to the length of the nipple used. At this point the wire shall be turned to a straight line parallel with the axis of the hose and shall extend to a point 1 in. from the ends of the hose.
 (e) The intermediate layer of rubber shall not be less than 0.07 in. thick, and shall be carefully formed around the wire and securely frictioned to the duck.
 (f) The cover shall be at least 0.07 in. thick of a composition of rubber adapted to resist the action of heat, abrasion and of the weather. It



shall be smooth and uniform in quality and thickness and free from injurious defects.

- (g) At each end of the hose there shall be an extra ply of duck extending 3 in. beyond the length of the nipple.

- (h) The dimensions of the finished hose shall be as shown on the order or drawings. A tolerance of $\frac{1}{4}$ in. either way in length, and $\frac{1}{8}$ in. either way in inside diameter will be allowed.

4. Tests—(a) Bend Test—Test samples will be bent 180 deg. until the two ends are parallel. The diameter of the inside of the bend shall be equal to three times the nominal inside diameter of the hose. The hose when bent in this position shall show no kinking.

- (b) Digester Test—This sample will then be cut into two pieces, one of which will be tested in its original condition, and the other will be placed in a closed digester and surrounded with dry saturated steam at 45 lb. pressure continuously for a period of 48 hours. It will then be allowed to cool for a period of 12 to 24 hours, and will be tested as specified immediately afterwards. As a result of the heating, the hose shall not develop any blisters, or loosening of any parts.

- (c) Friction Test—A 1-in. section shall be taken from any part of the hose so that one wire passes along the center. This section shall be cut open and flattened out and the friction determined between the tube and canvas, between the two layers on each side of the wire, between any two layers of canvas and between the canvas and cover.

One end of this piece shall be held in a suitable clamp of a spring balance, or pendulum type testing machine, and the different plies stripped off and pulled back 180 deg. to their original position, at the rate of 20 in. per minute. Readings shall be made every five seconds for at least four readings for each ply and the average shall represent its friction.

For Class "A" hose the friction of any ply shall not be less than 18 lb. before steaming and not less than 15 lb. after steaming.

For Class "B" hose the friction of any ply shall not be less than 18 lb. (d) Permanent Set—From the unsteamed tube and cover test pieces will be cut by means of a steel die, in accordance with Fig. 1, and will be stretched 2 in. to 5 in., held in this condition for one minute, released, and after resting for one minute the permanent set will be measured. This set shall not exceed 0.25 in.

(e) Tensile Test—From both the unsteamed and the steamed tube and cover, tensile test pieces will be cut by means of a steel die, in accordance with Fig. 1. Marks 2 in. apart will be placed on the pieces which will then be placed in a suitable tensile testing machine, whose cross-head moves at the rate of 20 in. per minute. The tensile strength and ultimate elongation of both tube and cover shall be as follows, the area of each test piece being calculated from the dimensions after stripping from the canvas:

	Unsteamed	Steamed
Tensile strength, minimum lb. per sq. in.	600	450
Ultimate elongation at rupture minimum, 2 in. to	6	4
Ultimate elongation at rupture, maximum, 2 in. to	10	8

5. Number of Tests—For each 200 pieces, or smaller lot of hose ordered, one extra piece will be furnished, and from each such lot one piece shall be taken at random for test to determine the disposition of the lot.

6. Marking—Each piece of hose shall have vulcanized on it a label of red rubber in accordance with Fig. 2. The letters and figures shall be clear and distinct and at least $\frac{1}{16}$ in. in relief.

Each piece of each test lot of hose shall carry a serial number as a part of the label. Serial numbers shall begin with one on the first of each year, and for the product of each manufacturer. If a serial of hose is rejected the serial number shall not be repeated.

(SIZE)"		Railroad Name or Initials		Classification A or B as Ordered						
		R. R. - TANK		A						
A. R. A. SPEC. No.	DATE	20							SERIAL No.	
		21	A	1	2	3	4	5		6
		22		7	8	9	10	11		12
		23		1	2	3	4	5		6
	24	R		7	8	9	10	11	12	
NAME OF MANUFACTURER										

Month and Year of Manufacture. For Record of Service The First Number to be the Year of Manufacture

7. Inspection—(a) The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications.

(b) The purchaser may make tests and inspection to govern the acceptance or rejection of the material, at his own laboratory or elsewhere. Such tests and inspections shall be made at the expense of the purchaser.

8. Rejection—Material which, subsequent to acceptance tests, shows injurious defects will be rejected. Material tested elsewhere than at the mill, failing to meet these specifications, will be rejected and shall be replaced by the manufacturer at his own expense.

9. Rehearing—Samples tested in accordance with this specification, which represent rejected material, shall be preserved for fourteen days from date of test report.

Supplementary Report

At the last convention the committee was instructed to consider the "proper fibre stress to be employed in the design of

helical springs for different diameters of steel wire from $\frac{1}{2}$ in. to $1\frac{1}{2}$ in. diameter. The ordinary spring table calls for 80,000 lb. throughout for all sizes, but it is well known that this is not the manufacturers' practice, and in many cases it is impossible to obtain a proper spring with the smaller sizes of wire."

The committee has reviewed available data on the subject and finds a wide divergence of opinion on the question of variations in fibre stress as a function of the diameter of the bar. The committee considers a full investigation of the subject necessary, including experimental work to develop the relations between the fibre stress and diameter, and all collateral data. The opportunity and time allotted has been insufficient to carry out these experiments, and the committee therefore reports progress.

The report was signed by F. M. Waring (Chairman), Pennsylvania; J. R. Onderdonk, Baltimore & Ohio; J. J. Burch, Norfolk & Western; I. S. Downing, Big Four; Frank Zeleny, Chicago, Burlington & Quincy; A. H. Feters, Union Pacific; H. B. MacFarland, Atchison, Topeka & Santa Fe; H. G. Burnham, Northern Pacific; H. E. Smith, United States Railroad Administration; J. C. Ramage, Southern; L. K. Sillcox, Chicago, Milwaukee & St. Paul, and C. B. Young, United States Railroad Administration.

Discussion

In addition to the printed report, F. M. Waring, chairman of the committee, submitted a mimeographed supplement, dated June 1, 1920, and also the following addition: With the approval of your executive committee, the committee on specifications and tests has cooperated with the American Society for Testing Materials to form a joint committee on steel castings for railroads. The joint committee has held two meetings at which the present specifications have been carefully reviewed and suggestions for new specifications considered. Two sub-committees have been appointed, one to draft the proposed specifications and the other to recommend standard methods for making the tensile tests, with particular reference to the determination of the elastic limit and the yield point.

There are a number of differences of opinion on this subject among both the consumers and the manufacturers that will have to be thoroughly discussed and adjusted. The manufacturers have a very complete representation among the A. S. T. M. appointees on the joint committee and the Committee on Specifications and Tests is being assisted by representatives from your Car Construction and Coupler Committees. Sufficient progress has been made to warrant the belief that the specifications can be prepared during the coming year and submitted to you for your approval at the next convention.

T. H. Goodnow: I move that the report be received and printed in the proceedings, and submitted to letter ballot. This motion duly seconded and carried.

Committee on Standards and Recommended Practice

THE WORK of this committee, in conjunction with the Committee on Specifications and Tests for Material, has been confined mostly to the combining of the standards and recommended practices as recorded for the Master Car Builders' Association and the American Railway Master Mechanics' Association and in preparing the Manual in the form that it has been recently furnished.

In the review of these standards and recommended practices, attention was drawn to some duplications and inconsistencies. These were corrected.

Progress only is reported on the subject of standardization of pipe unions, both flat and ball joint type, as to the contour and interchangeability of parts. The executive committee of the American Society of Mechanical Engineers, with which this is being handled, has delayed action until final report has been received on the subject of a universal pipe screw thread.

Safety chains for steel and wooden freight cars have been shown as a recommended practice since 1894 with one revision made in 1904. The present practice of railroads is not to use these chains and the committee recommends that this be submitted to letter ballot for dropping from the records.

The standardized tinware as adopted by the Committee on Standards of the Division of Operation—Mechanical Department, U. S. R. A., varied from the A. R. A. standard in the following details:

- No long spout engine oil can was included.
- The spout of the hand torch was designed to take 1-in. wicking instead of $\frac{3}{4}$ -in.
- The use of a metal fire bucket instead of the fiber bucket as shown was indicated.
- Cold-rolled steel of suitable thickness, with joints welded or brazed, was permitted where "IX" bright tin was specified.

The committee recommends that these changes, with the exception of the omitting of the long spout oiler, be submitted to letter ballot.

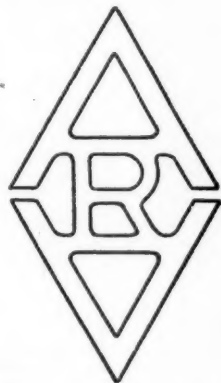
At the request of the A. S. M. E. Boiler Code Committee, a representative was present at the meeting of that society in December, 1919, and took part in the discussion in connection with a report on "Rules for Construction of Boilers of Locomotives Which Are Not Subject to Federal Inspection and Control." This code is based partly on the code for stationary boilers, but comes well within the range of the Interstate Commerce Commission rules. The sub-committee had introduced a

minimum factor of safety of four. There was considerable discussion on the part of some of the members of the Boiler Code Committee in an effort to raise the minimum factor of safety above four. All the representatives in the American Railroad Association expressed themselves as in favor of a minimum factor of safety of four, as that is the I. C. C. factor, and it has been proved by years of experience that with proper inspection and maintenance a factor of safety of three for barrels of locomotive boilers is amply safe and a factor of safety of four gives sufficient leeway for the maximum carelessness in inspection and maintenance that may be encountered.

A member suggests a special designating symbol for "heater box cars." This is a car apparently prepared for local use and therefore your committee does not approve the assigning of a special symbol.

A member suggests the use of a special designating symbol, "TI," for tank cars insulated for handling casing-head gasoline, etc., built under the specification for Class IV Tank Cars and now shown in the "TM" group. The committee recommends the use of the symbol "TMI" for such cars.

Under the instructions of the General Committee, the monogram shown has been prepared as a substitute for the M. C. B. monogram.



Proposed Substitute for the M. C. B. Monogram

To maintain uniformity in the stenciling of cars for the repacking of journal boxes as required by Rule 66, the com-

mittee suggests the following addition to the standards on lettering and the necessary changes in the drawings to correspond:

"The word 'Repacked,' together with the date (month, day and year), shop or station abbreviation and railroad reporting marks, to be stenciled in one-inch block letters on each side of the car to the right of center as near the lower edge of the side sill as practical and just to the left of the body bolster."

The report was signed by W. E. Dunham (Chairman), Chicago & North Western; A. R. Ayres, New York, Chicago & St. Louis; A. G. Trumbull, Erie; W. F. Kiesel, Jr., Pennsylvania System; A. R. Kipp, Soo Line; W. J. Robider, Canadian Pacific; J. Hainen, Southern, and C. A. Gill, Baltimore & Ohio.

Discussion

The report was presented by A. R. Ayres (N. Y. C. & St. L.).

Vice-chairman Coleman: This report is now before you for discussion and certain sections will be submitted to letter ballot.

I. S. Downing (C. C. C. & St. L.): I move that the word "day" be eliminated from the last paragraph of this report, and that it show the month and year only. That relates to the repacking of the cars.

(The motion was duly seconded, put to vote and carried).

Mr. Downing: Is the monogram shown on the last page of the report to be used by any other section of the American Railroad Association than the Mechanical Section?

Mr. Ayres: That question has not been taken up.

Mr. Downing: I should dislike to see the legend, "M. C. B." dropped from any of our equipment. I think we should continue to be the M. C. B. Section of the American Railroad Association. The Book of Rules of the A. R. A. is a large red book, containing many items, and it also includes the rules of interchange.

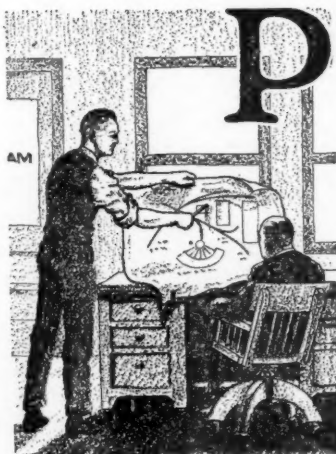
Vice-chairman Coleman: Your idea is to perpetuate the distinction of the "M. C. B." in marking the equipment, as part of the American Railroad Association?

Mr. Downing: Yes.

F. W. Brazier (N. Y. C.): If the convention will kindly wait a little longer I believe there will be a resolution offered to cover that. I do not want to see the name of the M. C. B. go, and I believe there will be a resolution offered on that subject which will meet the approval of the members of the Association.

A motion to accept the report, print it in the proceedings, and submit such parts as necessary to letter ballot was made, seconded and carried.

Report of Committee on Repair Shop Layouts



PRELIMINARY CONSIDERATION of this subject clearly indicated that the efforts of the first year should tend to establish certain basic principles rather than to develop a complete report.

The committee is submitting a tentative shop layout embodying general features, together with general observations on the subject. Criticism is invited which should tend toward the development of complete and specific recommendations in the future. From the progress made so far and the discussions which it is anticipated will follow, there

will be currently available considerable information which it is hoped the members of the association will take advantage of in considering their immediate needs and work contemplated.

It was decided in the preliminary layout of a repair shop to submit the general characteristics of a shop with an ultimate 100-car daily output. Such recommendations being submitted in units providing for 25 cars a day, and the expansion

program so mapped out that the layout would be expanded in units of 25 cars a day until the ultimate capacity of 100 was reached.

Shop Space Requirements

Some investigations developed the fact that space should be proportioned from the following data:

A—STEEL CAR PLANT

(1) For heavy repairs, 25 steel car spots will turn out from each spot one car every six eight-hour days, or four cars per day.

(2) For medium heavy or heavy light repairs, 25 steel car spots will turn out from each spot one car every three eight-hour days, or eight cars per day.

(3) For light repairs, 50 steel car spots will turn out one car from each spot every eight-hour day, or fifty cars per day.

B—WOOD CAR PLANT

(1) For heavy repairs, 25 wood car spots will turn out from each spot one car every six eight-hour days, or four cars per day.

(2) For medium heavy or light repairs, 25 wood car spots will turn out from each spot one car every three eight-hour days, or eight cars per day.

(3) For light repairs, 50 wood car spots will turn out one car from each spot every eight-hour day, or 50 cars per day.

While the committee provides, in the general plan of the 100-car shop, space for wood cars, and while it is recognized

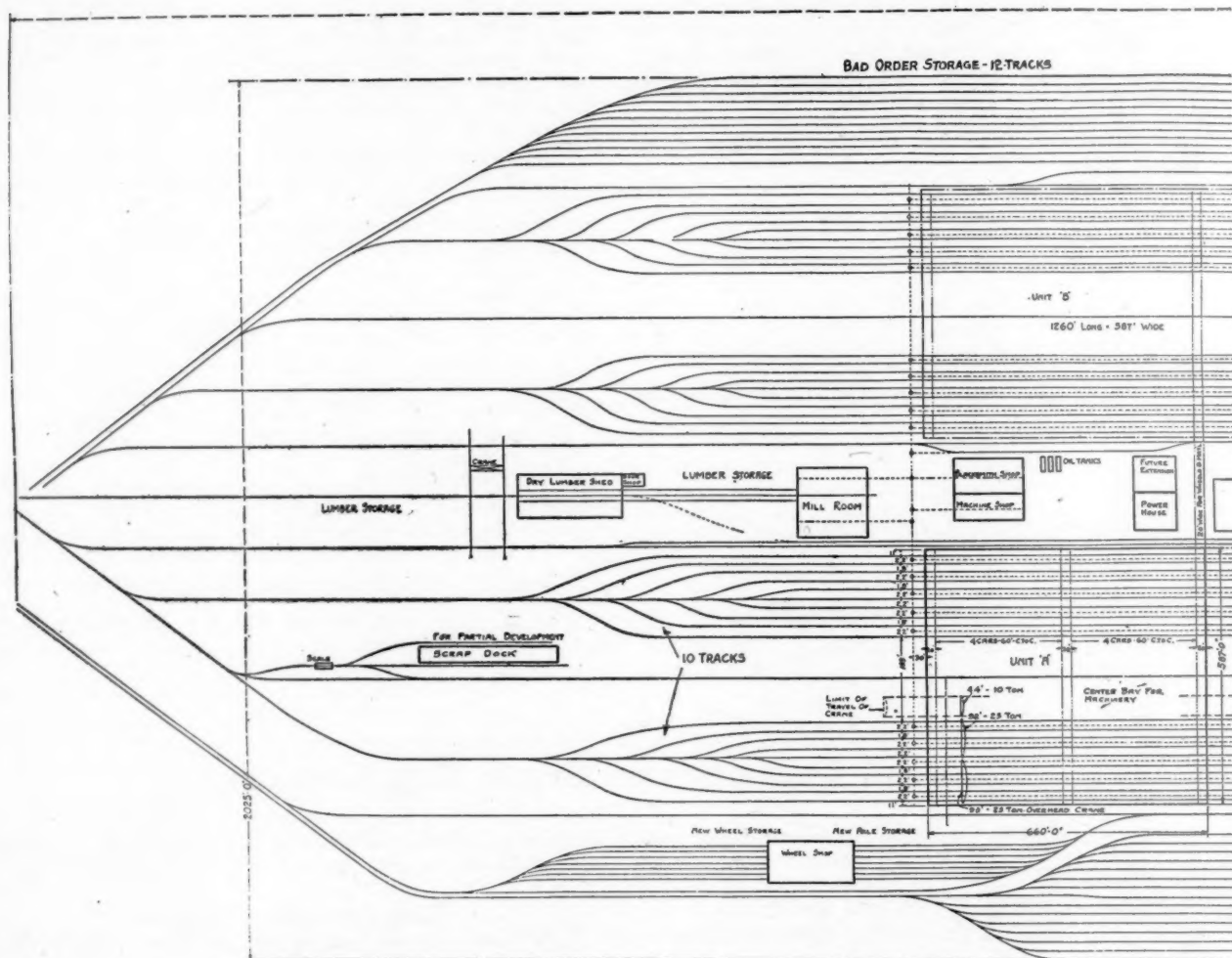
that for a great many years there will be wood cars to consider and for a considerable time longer steel cars with a certain amount of wood work to be performed, the major part of the committee's considerations are devoted to steel cars.

Consideration of the units of measure decided above is invited in order to develop what the actual conditions are over the country as a whole, to what extent they vary for various sections of the country, and as to just why these variations occur. Certain modifications will have to be made ultimately in such specific recommendations as are made should these units of measure vary between considerable limits.

The construction of buildings, when ultimately developed, should be the joint work of the engineering and car shop com-

general, but specific advantages should be more clearly established before final recommendations are made. The distribution of compressed air is largely one of local preference and conditions, but, with the ultimate capacity of the plant considered, it is deemed advisable to provide several electrically driven air compressors located near points of consumption in preference to two or more large units located at a central point, both on account of economy of distribution and continuity of service.

The question of machine tools is a matter for considerable discussion. The layout of tools and their number as shown is more as a suggestion than a recommendation. In this connection it should be recognized that, up to the present time,



Proposed Plan of Buildings and Tracks for Freight Car Repair Shops.

mittee. For the present, it is thought sufficient to conform to buildings which in plan are practically square. Roof construction involves the geographical location of the buildings and their layout relative to the points of the compass. Several alternatives will probably have to be recommended. Building materials are largely construction matters not essential to the general subject other than in final consideration of the cost. The development of the plant and facilities as to capacity, efficiency and economy of operation should first be completed, and construction as reflected in first cost worked out as secondary considerations.

Track spacings, such as shown for larry and service tracks, are believed to be representative. Height of buildings will be largely governed by operations taking place therein and the extent to which cranes are installed. Where cranes are used, a clearance from rail to bottom of crane girder of 22 ft. is suggested. All larry track should be of standard gage with plank between the rails for tractor service.

Gas and electric cutting stations should be considered in

the steel-car repair work is carried on largely by machine tools primarily designed for locomotive work and that, no doubt, great economies can be perfected by the design of machine tools specifically adapted to car-repair work.

The location of cranes and their installation, as shown by the plans of the committee, are recognized as facilities, the installation of which need not be carried on to the maximum point at the time of the initial construction of the shop, but should be provided and installed as conditions indicate their economy.

The report was signed by I. S. Downing (Chairman), Big Four; Geo. Thomson, New York Central; J. J. Tatum, Baltimore & Ohio; C. W. Renner, Pennsylvania; W. J. Robider, Canadian Pacific, and J. C. Fritts, Delaware, Lackawanna & Western.

Discussion

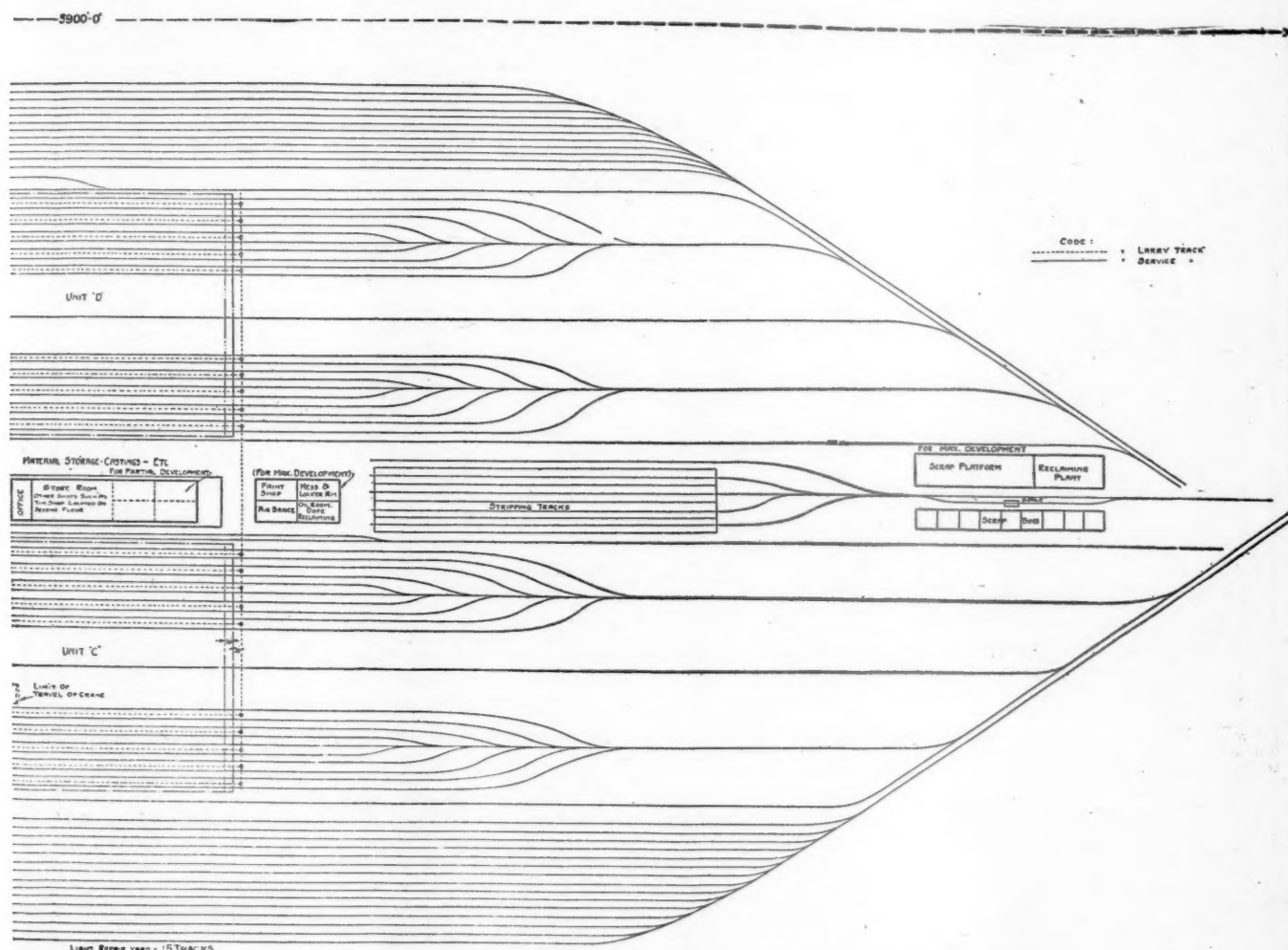
I. S. Downing (C. C. C. & St. L.) presented the report and requested that individual members criticize the layout and

advise the committee of their suggestions. Under the subject of buildings in the last paragraph, it is stated that the construction of buildings, when ultimately developed, should be the joint work of the engineering and car shop committees. Section II has appointed a committee which, I understand, includes the roundhouse. The committee will ask for instructions to work jointly with the committee of Section II. On the last page, we want to call particular attention to the next to the last paragraph, or rather the closing portion of it. Machine tools for steel car work have been manufactured by individual roads, and they are good economical machines, but the other fellow does not find out about them, and if the machine designers and supply men

eral states have passed laws requiring the sheds to be enclosed.

I would like to hear from some of the members, whether they feel that freight car repair work should be done in a shop that is enclosed, or whether sheds are preferable for general work.

F. F. Gaines (Ry. Bd. Adj.): Mr. Fuller has raised a very good question in regard to the matter of shelter. You must cover your repair tracks to a very general extent, because if you do not, you pay your labor and get no result. Men who are compelled to work out in the snow and rain, produce very little work. They are more concerned with their bodily comfort than they are with the work. Also appliances around a repair shop



Proposed Plan of Buildings and Tracks for Freight Car Repair Shops

would get busy and investigate this field and see what we need, they could manufacture tools much more cheaply than we could do it in our own shops. We hope the committee will be continued and instructed to work with this other committee.

A motion was passed that the report be accepted and printed and that the committee be continued.

C. E. Fuller (U. P.): May I ask the committee if this proposed freight car shop is to be an enclosed shop?

Mr. Downing: Yes.

Mr. Fuller: All under cover?

Mr. Downing: Yes.

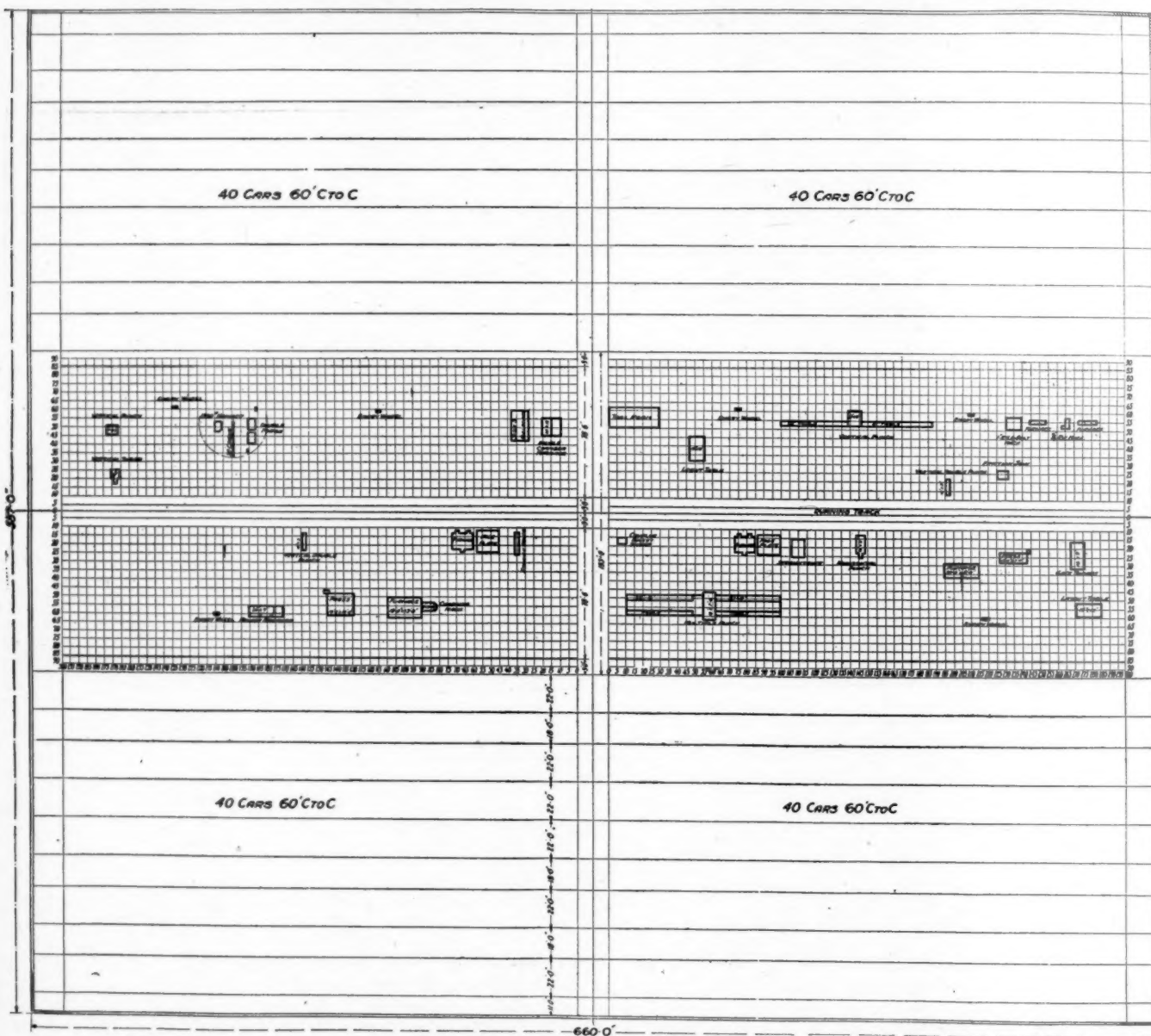
Mr. Fuller: We have members here who represent railroad systems from all parts of our country, in places where it is hot and cold, and places where it rains, and where it does not rain. Our members represent the various sections of the country, with various conditions of climate. There has been a good deal of comment made, pro and con, relative to the advisability of having enclosed shops for freight car work. Sev-

must be selected with the idea of bringing about the greatest possible economy in the handling of material. You must have appliances that will cut down the amount of common labor and facilitate the handling of material. One of the most important items in the layout of the repair shop is the installation of proper crane service. Instead of having a lot of trucks pushed by hand the time has come when we should provide runways between the different departments and install electric trucks to carry material. Another thing that is essential and has a large bearing on this question, is the necessity of providing necessary toilet facilities, good locker rooms, wash rooms, plenty of drinking water, etc. The question as to whether a repair shop should be enclosed or not depends upon the climate. In some places it is only necessary to provide shelter from snow and rain, and in others the repair shop must be closed entirely, and heated in the winter time. When this is done you can get enough extra work out of the men to pay for the extra investment involved. If you can make provisions for a track with gantry crane service and do away with jacking up the cars, it will be a very profitable

investment. It is entirely too expensive to continue to do that work by hand. In a general way, I think the committee should look at the whole thing from the standpoint that we are now paying very high wages, for both skilled and common labor, and everything that will add to the efficiency of the men is important.

C. E. Chambers (C. of N. J.): I am heartily in favor of an enclosed repair shop, where the climatic conditions require it, and further, that it be properly heated, so that a man can work in the winter time with a reasonable amount

of shops. They could repair the cars outdoors. That official never did any work in a repair shop and never worked out under a car when the temperature was 10 or 15 deg. below zero. He was strong for the roundhouse and thought it was necessary to have a roundhouse properly heated, and equipped but for the car shop, anything was good enough. In all sections of the country, the car department needs shops, and they should be enclosed in most cases. Perhaps you do not need enclosed shops in a section like New Orleans, but you need something to protect the men from the heat. In the West and in Canada you



Arrangement of Tools in the Main Shop; Capacity 160 Cars; Output 25 Cars a Day

of clothing on and not be too clumsy. In the southern part of the United States I presume a roof over the repair shop is all that is necessary, as it will shield the shop from rain and snow, but in the north and west you must enclose the building if you expect to do other repairs than putting in couplers and brake beams, or other very rough work. The time has come when you should make the shop the most comfortable place around the plant. If the toilets are more comfortable than the shop itself, the men are inclined to stay in the toilets longer than they will do if the shop itself is at a comfortable temperature.

F. W. Brazier (N. Y. C.): A few years ago many railroad officials thought anything was good enough for the car department. I remember when on the Illinois Central, a certain official said that the car department, in his opinion, did not require

require a closed shop, and as Mr. Chambers said, it should be well heated.

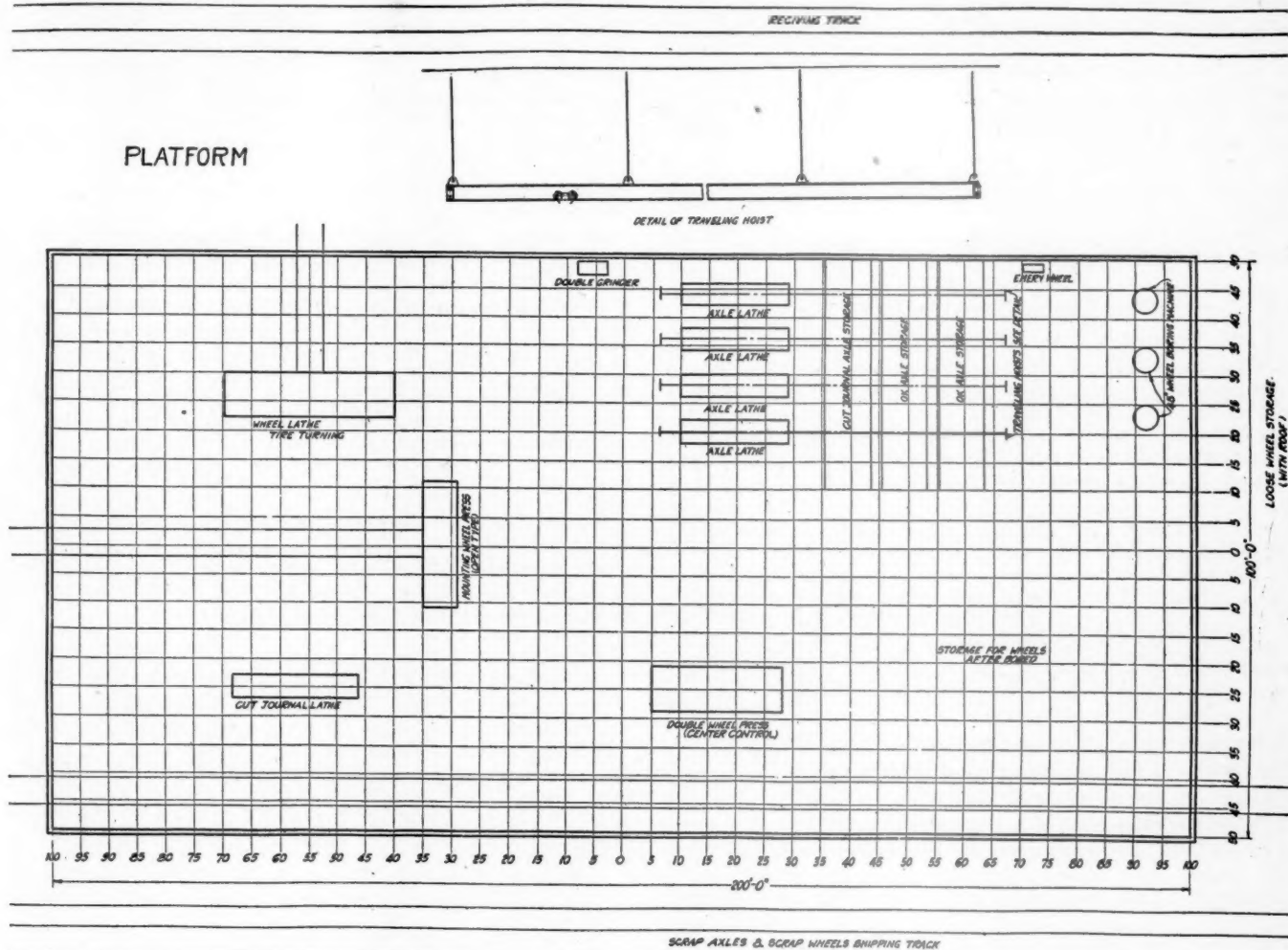
C. E. Chambers (C. of N. J.): I would like to add a word to what Mr. Gaines has said in regard to delivery of material. Few of us realize what it costs to bring the material from the mill to the car where it is to be used. If you walk through the ordinary car shop, you will see a gang of six or seven men with a truck, and about two men pulling, the other five men leaning on the truck and walking beside it. Good runways and electric trucks for carrying materials to the cars will minimize the cost.

F. F. Gaines (Ry. Bd. Adj.): One of the most important things around the car shop is a large runway with a traveling crane. The crane should have a magnet for loading and unloading car wheels and handling scrap. One man can load and unload car wheels with a little help in guiding and picking them

up, and handle all the scrap. A gang of from 10 to 20 men can be replaced by one crane.

Mr. Downing: I would like to call attention to one portion of the report which I did not read. It is as follows: "It is believed that track spacing such as shown for lorry and service tracks are representative. Height of buildings will be largely governed by operations taking place therein and the extent to which cranes are installed. Where cranes are used, a clearance from rail to bottom of crane girder of 22 ft. is suggested. All lorry track should be of standard gage, and planked between the rails for tractor service." The committee realizes that this is a very important subject. We expect to consider the handling of cars the same

how far it should go. Years ago, when I worked in the locomotive shop, I found it very comfortable stripping and erecting locomotives, as the shops were well constructed, enclosed, and were properly warmed. We could take off our over clothes and do a good day's work. I think if the locomotive men will get behind the car men, it will assist the latter in getting the protection which they feel is necessary. For that reason I would like to hear more of the locomotive men talk on what they think the car men should have to do their work properly. We are paying high, hourly rate for labor, and every hour lost means so much money lost. It does not mean now, as it did a few years ago, 15 or 18 cents an hour, but in most of the cases it is now 67 cents an hour, and perhaps more. We want the help of the



Proposed A. R. A. Freight Car Repair Shop; Wheel Shop Tool Layout.

as they do in freight houses in England, without engines, and we expect to make an investigation to show how the work should be handled in different localities.

Mr. Gaines: The idea that you do not require an enclosed building in the South is a mistaken one. There may be some points in the extreme southern parts of Texas, and probably around New Orleans and Florida, where it will not be necessary to have an enclosed shop. Outside of a few places of that character, the shop which is not enclosed is heinous. In the South even, when the temperature gets down to 20 deg. above zero, the people in that section of the country who are not used to such a low temperature, do very little else than hang around a coal stove and try to keep themselves warm. The best investment you can make is to build an enclosed shop and heat it in winter. An indirect heating system for the shop can be reversed in the summer and cool air can be forced through the shop.

J. J. Tatum (B. & O.): I do not care to discuss the layout reported by the committee, being a member, but I will say that the committee feels it should have some encouragement as to

locomotive men in getting these added facilities, and hope they will take the opportunity of expressing their views.

Mr. Fuller: Mr. Tatum asks how far they can go. I think from what has been said here this morning, with the suggestions of the committee, that there does not seem to be any limit. They can go as far as they want. The committee has this subject in charge. Let them make up a car repair shop layout that is 100 per cent, and we will stand back of it. I have heard Mr. Brazier talk about the nice roundhouses and how well everything is laid out in these houses. I do not think he has been in very many roundhouses or he would not talk that way. We have a committee on roundhouses and terminals, and it is up to these two committees to make terminals that will save money and give the desired results.

C. F. Giles (L. & N.): The steel underframe cars were introduced on the Louisville & Nashville about 1909. In 1912 we purchased a large number of steel coal cars. We realized that facilities must be provided for repairing and maintaining these cars, basing our judgment largely on the condition of the steel equipment operating on other rail-

roads in our territory. Apparently they were going to pieces. You simply cannot operate a railroad car built of steel or iron without taking means of preventing it from going to pieces through deterioration, rust, etc. I put the proposition up to our management, to secure authority to build a shop for the express purpose of repairing and maintaining, and if necessary, building all-steel equipment. We got an appropriation of about \$300,000 and erected what was considered an up to date shop, installing improved machinery, including three cranes, and I do not believe there has been a dollar spent in connection with the Louisville & Nashville that pays a better dividend. We found these cranes adaptable for many things never before dreamed of, even in the case of wooden cars. We found it useful in building new equipment, putting the work together on the floor, and putting it on the car finished, ready to make connections.

Mr. Downing: I would like to suggest, as long as the question has come up, that we increase our committee by two men, appointing one man from the Middle West and one from the South.

Vice-chairman Coleman: The Secretary will make a note of that and present your recommendation to the Committee on Subjects.

The motion was carried that the report be received and printed in the proceedings, and the committee continued.

The Labor Question Bobs Up

C. E. Fuller (U. P.): I would ask the indulgence of the Convention just for a moment. There has been a good deal said here today, and a good deal was said the other day, in a way, about the application of these methods of producing increased economy, but I do not believe that we have considered or are considering this subject as seriously as it deserves. The amount of money spent for labor today is enormous. How

can we ever hope to bring our maintenance costs down to the figures which prevailed a few years ago, or to the figures to which the costs should be brought today, if we do not get busy and give a little more thought and a little more energy to the putting up of proper terminal facilities for handling the work and methods for handling material quickly. We are all guilty, to a large extent, in accepting the idea that we can get along for another year or two. Have we realized, and do we realize now, that the dollar spent for labor today, to say nothing about the costs of materials, has gone clear out of sight, and that it is our duty to do everything we can to get the cost of labor down? There are only two ways in which to get that cost down that I know of. One is to increase your supervision, make it more effective, and the other is to strongly advocate proper facilities and tools for handling this work. I do not believe it is any hardship or trouble to plainly and emphatically make up a statement of what savings can be made by having facilities that will enable us to increase output and decrease the number of men in your service.

The question of labor to-day is a vital one and if we can put a machine or truck into operation that will do away with 6 laborers and bring material to the point where needed in one-half or one-third of the time, we should make every justifiable effort to get it.

Mr. Gaines: Mr. Fuller has struck the keynote of this whole problem. Common labor 10 or 15 years ago was a negligible factor, and we did not think it necessary to give the labor the necessary and reasonable facilities for doing the work. We allowed labor to jack up the cars and do other work of that kind which might have better been done by machinery. Mr. Fuller spoke of the supervision. We have not taken care of the supervising forces and paid them according to their responsibilities under the new schedule. If you do not take hold of this thing, they will go into manufacturing establishments, where they can make more money with less responsibility than they have to-day.

Amalgamation of Other Mechanical Organizations

THE COMMITTEE ON AMALGAMATION of Minor Associations with Section III-Mechanical can make only a progress report. One Association, namely, the Master Painters' Association, has formally accepted the invitation of Section III-Mechanical to become a part of that organization, and lively negotiations are being carried on with the other Associations with that end in view.

The report was signed by W. O. Thompson (Chairman),

New York Central; T. L. Burton, New York Central; E. W. Pratt, Chicago & North Western; J. E. Fairbanks, general secretary, American Railroad Association, and V. R. Hawthorne, Secretary, Section III-Mechanical.

Discussion

The report was read by W. O. Thompson of the New York Central. *A motion to accept the report and continue the committee was carried.*

Standard Blocking for Cradles of Car Dumping Machines

THE COMMITTEE finds that two car dumping machines have been equipped with the recommended practice for blocking for cradles of car dumping machines.

As the recommended practice was adopted after the close of navigation, there has been very little opportunity to observe the working of the machines so equipped. It is felt, however, that the cars will be better supported and less damage will result to them if the recommended blocking is applied.

The committee would like to receive reports from any of the members who may observe car dumping machines equipped with the recommended blocking. Members of the committee will make inspection of the blocking on machines within their territory prior to the opening of the lake boat season and as often as possible during the season, to observe the condition of the blocking.

It was also decided to recommend to the Committee on Car Construction that for any type of car liable to be used in connection with dumping machines, it be so constructed as to fit readily to the dumping machine with the recommended standard blocking without damage to the car.

The report was signed by John McMullen (Chairman) Erie; J. W. Senger, New York Central; J. J. Tatum, Baltimore & Ohio; Geo. Durham, Wheeling & Lake Erie; T. W. Demarest, Pennsylvania System; J. E. Davis, Hocking Valley; G. M. Gray, Bessemer & Lake Erie, and J. A. Pilcher, Norfolk & Western.

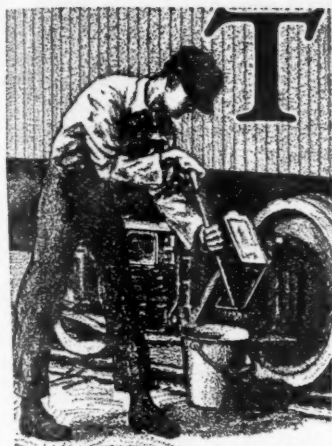
Discussion

John McMullen (Erie), chairman of the committee, presented the report, and said:

This report is submitted in the way of a progress report, and the committee would recommend that they be continued to look into the matter further.

F. W. Brazier: *I move that the report be accepted, the recommendations approved, and that we refer part of the report to the Committee on Car Construction, to carry along the work in conjunction with the work of that committee, and that the committee be continued. This motion was seconded and carried.*

Standard Method of Packing Journal Boxes



THE COMMITTEE SUBMITS the following report and recommends that it be submitted to letter ballot for adoption as Recommended Practice:

Standard Method of Packing, Cleaning and Assembling of Journal Boxes on Locomotive Tenders and Cars.

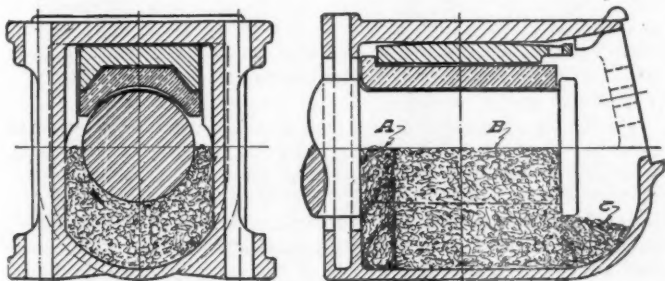
Preparation of New Packing—The waste must be loosened, placed in a saturating vat and kept completely submerged in car oil, at a temperature of not less than 70 deg. F., for a period of at least 48 hours to insure thorough saturation. It shall then be drained for the

purpose of removing the excess oil, until the packing is in a resilient or elastic condition.

Prepared packing in storage should be turned over at least once each 24 hours, or the oil which has accumulated in the bottom of the container shall be drawn off and poured over the top of the prepared packing.

Preparation of Renovated Packing—All packing, when removed from journal boxes for the purpose of periodical repacking or renovating, should be pulled into a container, avoiding contact with the ground or any other place where it may pick up dirt, and taken to the waste-reclaiming plant. This packing must not be reused until renovated.

In reclaiming packing it should be first picked over carefully and dirt, metal, etc., shaken out, the knotted strands of waste pulled apart, and then placed in hot oil in a renovating tank for a short time, working it with a fork for the purpose of thoroughly washing and loosening it. It should then be rinsed in



Proposed Standard Method of Packing Journal Boxes

clean oil, then drained for the purpose of removing the excess oil.

Cleaning Boxes—Before packing a journal box the oil cellar shall be thoroughly cleaned of all dirt, sand, scale and grit, and if water is present it must be removed. When new journal boxes are applied, or when reapplying journal boxes, the interior of the box, including the dust-guard well, shall be so treated, and close-fitting dust guards and lids should be applied.

Cleaning and Applying Bearings—Before applying journal bearings they shall be thoroughly clean, have a smooth bearing surface, free from irregularities, and shall have a proper bearing. Under no circumstances is it permissible to use sand paper, emery paper or emery cloth for the purpose of removing irregularities from the bearing surface. A half-round file or scraper should be used. Care must be taken that the wedge has a good contact on the crown of the journal bearing. The surface of the journal should be smooth and thoroughly clean before the bearing is applied. When applying a journal bearing a coat of lubricating oil must be applied to the bearing surface. Never wipe the bearing surface of the journal bearing with waste.

Application of Packing—(a) Inner.—In packing a journal box, twist somewhat tightly a rope of packing and place it in the extreme back part of the box, as shown at A in Fig. 1. Make sure that it is well up against the journal so as to properly lubricate the fillet on the journal and keep out the dust.

(b) Main.—Apply sufficient packing (preferably in one piece) to fill the space shown at B in Fig. 1. Take care to have this packing bear evenly along the full length of the lower half of the journal. The packing should not be too tight but should be tight enough to overcome any tendency to settle away from the journal. The packing should extend to approximately the center line of the journal but not above at any point, and should be pressed down evenly at the sides that no loose ends may work up under the journal bearings.

(c) Outer.—Apply a third piece of firmly twisted packing as shown at C in Fig. 1, and pack tightly in order to prevent displacement of the main packing. There should be no loose ends hanging out of the box as they would tend to draw out the oil.

General Remarks

In addition to the above recommended practice the committee desires to emphasize the importance of causing the observance of several other factors as follows, with the view of reducing hot boxes to the minimum:

It is very essential that journals, after being turned, should be cylindrical, free from taper, tool marks, ridges, corrugations and other defects. In other words, a turned journal should reflect first-class workmanship which is only possible of attainment through the use of machine tools, in good condition, of a design suitable for the nature of the work and capable of producing it with precision. This committee feels that an attitude of indifference prevails in many quarters with respect to the necessity of providing suitable heavy-duty lathes for the machining of axles, especially the larger sizes, and, as a result, many obsolete and worn-out axle lathes are being continued in service, whereas a close examination would disclose defects in the machining of the axles that would prove such lathes incapable of meeting the requirements and warrant their retirement from service.

It is suggested that the attention of all concerned be directed to the necessity of fully protecting journals against rust and corrosion during storage and that due care should be exercised in the handling and shipment of mounted wheels to guard against the damage which journals are subjected to through coming in contact with flanges of wheels as a result of improper loading or careless handling around shop yards.

It is also highly desirable that rigid instructions be issued to effect a more careful practice in the handling of journal bearings, especially for shipment, to prevent the indiscriminate tossing of journal bearings against each other, thus nicking and needlessly damaging the smooth bearing surface of the babbitt metal lining.

The committee submitted drawings showing two representative waste-reclaiming plants and a set of journal box packing tools.

The report is signed by C. J. Bodemer (Chairman), L. & N.; Ira Everett, L. V.; I. S. Downing, C. C. & St. Louis; C. J. Nelson, C. & N. W.; J. H. Milton, C. R. I. & P.; J. P. Young, M. P.; C. F. Thiele, Pennsylvania System, and G. W. Ditmore, D. & H.

Discussion

C. J. Bodemer (L. & N.) presented the report and said: I will not read the report in full, in order to allow more time for discussion, and will just pick out briefly one or two of the important parts in each paragraph. In connection with the first paragraph, "Preparation of New Packing," the road I am connected with uses presses very successfully. It gives a packing which has about the right quantity of oil mixed with the waste. We did not feel, however, that it was proper to specify, and we leave that to the managements of the railroads to pass upon. In connection with "Preparation of Renovated Packing," you will observe that all packing removed from the boxes for the purpose of periodical packing, must be renovated before it is used. We thought it well to include that point. In the general remarks, we emphasize the necessity of providing pretty good

machinery for the car department, especially the turning of journals, and to see that as good work as possible is done.

F. W. Brazier (N. Y. C.): Quite a number of our members are members of the General Car Inspectors Association, and I hope they will express their opinion on this paper.

C. F. Chambers (C. of N. J.): This method of box packing is decidedly different, I think you will all agree. I would like to ask whether or not the roads have found it required a good deal of attention to keep the ordinary box packing in position by using only this small form of wedge in front of the box. A journal rapidly turning has the tendency to crowd the waste toward the end of the box. I imagine you will find this small wedge working up to the level of the lid very often if you look into the box, which means that the packing must have settled away from the journal considerably.

I. S. Downing (C. C. C. & St. L.): The New York Central has operated very successfully without any wedge. We find it has the effect which Mr. Chambers describes, that the waste will turn around and work out, and it works the wedge out with it. The idea of using the wedge is that the oiler can get at the packing more readily. Mr. Nelson, of the New York Central, and Mr. Taylor, of the Galena Signal Oil Company, made extensive tests on our road of different methods of packing. They went into the hot box troubles very thoroughly, and we have now for the last five years operated without this wedge. While I am on the committee and signed the report, I believe you can do without the wedge.

J. J. Tatum (B. & O.): We were using the dressing in front of the journal box for a number of years, but found that the piece of waste would move up the lid and crowd its way out of the box, taking the oil with it. This added to the expense and further helped to rob the journal of lubrication, so we decided to do away with it.

T. H. Goodnow (C. & N. W.): The application of that piece in the front of the journal box as a wedge depends on how it is put in. If the wedge is put in carelessly, it does no good, but if it is put in right, it does a whole lot of good. I think the reason why Mr. Tatum is getting along so nicely is because the rest of us operate his cars and put it in, and keep it going. If the wedge is put in properly, twisted or rolled and locked under the collar of the journal, it will stay there. It saves the waste from the centre of the journal from rolling out, which it will do otherwise. It also serves the purpose of catching the dirt, and anything else that works in, when the oil box lids are missing. I am strongly in favor of this wedge, and while I believe it is not necessary to fill up the journal box to the centre line of the journal, as has commonly been done before, the small wedge there is a very essential element.

Mr. Tatum: I would agree that Mr. Goodnow was right in the matter if you had something to hold the wedge there, but as a matter of fact, you cannot have a wedge on any such place as the smooth surface of a journal box, and hold it in position. The seat wedge is crowded up to the box lid and the oil is crowded out with the waste under the journal, along with the seat piece when it gets there.

Mr. Goodnow: I would like to ask Mr. Tatum how he is going to hold the packing in the journal box if he cannot hold his wedge? The dressing of the average journal box, if it is done right, is putting the packing down along the box and simply bringing it up around. But it is necessary to leave an opening for the man to shove his packing iron down through the box and in the centre of it, and I think you are simply making trouble instead of helping it out. If Mr. Tatum cannot hold that little piece of waste there, he is not going to hold his wedge either.

Mr. Tatum: We don't hold it there any better, but we hold it just as well. During government control a very ambitious gentleman wrote the director general and told him that we were not properly treating journal boxes on the B. & O. and for that reason we were setting up a condition that would cause cars to be set out. The gentleman had to appear before me, and he explained the conditions he had to contend with, and described the fact that we left out this piece of waste in front of the journal box, and he said the cars ran but a short distance before they were hot, and had to be set out on a side track. When he gave this information, I got together our

records, and showed him that the car mileage had increased from 9,000 miles per heated journal when we used the wedge piece in front of the box, to 19,000 miles when we omitted it.

R. L. Kleine (Pennsylvania System): I think this committee has presented a very good report and I believe it should be adopted, so that we get a uniform practice for packing journal boxes. In regard to the front plug; for high speed service, preference freight and passenger service, you will need the front plug. In the first place, you will have to pack your packing, which is termed No. 2 in the report, well back of the collar, and shove that packing back of the vertical line of the face of the collar, so that the collar cannot work on the strands of the waste and pull it from in back of the box.

About three years ago we wanted to do away with the front plug, and took it out of our passenger equipment cars. We found especially when we got into the winter, that the waste worked forward at the bottom although the collar at the top may hold it. It worked forward in a distance of 100 miles, so that we had to continually set up the packing en route, and we had to put that front plug back. We may some day get some other method of holding the No. 2 packing under the journal, but until we do we want to continue the front plug.

J. Snowden Bell: With reference to the tendency of packing sliding toward the lid of the box, it appears to be a very natural tendency. I have observed lately several designs intending to obviate that by making a tooth on the bottom of the box which would not interfere with the insertion of the packing, but would intend to prevent its outward movement. I would like to ask whether any of the members have ever devised any scheme of that kind.

A. V. Appler (D. & H.): I cannot too strongly endorse the recommendations of the committee regarding the proper preparation of the journal. I think a great many difficulties arise from the journals not being turned with a broad-nosed tool, causing ridges in the journal which cannot be rolled out, and have a rasping effect on the journal bearing, which destroys the lubrication. If the packing is not very carefully applied, the ultimate result will be hot journals. I think probably a great many hot boxes are blamed on the method of packing, where it is possibly more due to the method of finishing the journal. The proper size fillet is also very important, as there seems to be a tendency to make sharp fillets in re-truing the journals, which encourages broken collars. The importance of good dust guards and tight journal box covers cannot be too strongly emphasized.

Mr. Curry: I think I have given as close attention to packing boxes in the last two or three years as anybody in this room. It seems to me that we are getting the cart before the horse in connection with this little plug of waste in front of the journal. What we need in these boxes is some oil. And furthermore we want to keep the waste at least down to the center line of the journal, and not have so much packing in them. I have demonstrated that waste grabs from the lack of oil, and too much waste is the primary cause of heating boxes. I wish to support in the strongest terms possible Mr. Goodnow's contention that we should have some waste in front of the journal for the various purposes that he outlines.

H. T. Bentley (C. & N. W.): Replying to Mr. Bell's question about teeth in the bottom of boxes: William McIntosh, in his engine truck cellars had teeth in the bottom of the cellar, so that the waste was held in position, and we are still using it on all our engine truck cellars.

Mr. Goodnow: I would like to ask the chairman of this committee a question. He touched on the question of pressing oil and draining oil. I would like to know if the committee went into that to determine which was the best method to use. I think that is quite important with this fairly heavy charge in the M. C. B. rules, allowing for the periodical packing of the equipment. Up until very recently it has always been contended that the pressing of prepared packing should not be done, but it should be allowed to drain a certain number of hours. Now, if you can use presses and take more oil out of the packing than you will by simply letting it drain itself, it is going to be quite an item of economy so far as oil is concerned. If there is any tendency to take too much oil out of it, however, and hot boxes and cut journals result, that is a very poor saving. I think that that is one method of practice that should be definitely

established, so that all the railroads will do it one way or the other.

Mr. Gaines: I have tried both processes. You can save some time and get a lot more oil by pressing, but you haven't given the waste sufficient time to take up all the oil it will. Some of the waste will absorb the oil much slower than other portions and when you are through it will not have the proper quantity of oil. It may take time to let the waste soak, but you have a well-saturated waste. The problem is not solely to save oil. Put the oil in and let the cars get over the road.

Mr. Goodnow: I am in favor of the draining process.

Mr. Giles: We have been following the practice recommended by the committee in packing journal boxes on the L. & N. for the past 15 or 16 years with great success, and yet we have been using the pressing for preparing the packing for probably five years with equal success. The point is to keep the oil in the box the same length of time that is advocated. The only difference is that when we want packing to ship it out to some outlying point, we press it and ship it out fresh with the oil saturated through the waste uniformly. When it is drained the bottom part of the waste lying on top of the strainer will necessarily contain more oil than the top part.

Referring to what Mr. Kleine said, we discovered in the interchange of equipment with the Pennsylvania that they had eliminated this ridge in front of the box. I issued instructions that they were not to replace that wedge, but let it remain out. Our experience was just exactly as Mr. Kleine states; we found it was absolutely necessary to replace it.

There is a certain amount of free oil that settles in the bottom of the box, and that wedge prevents that oil running through the front end of the box, and keeps it under the waste where it will do the most good.

Mr. Curry: I would like to ask Mr. Giles how this free oil gets into the box in the process that is being discussed.

Mr. Giles: It necessarily runs down out of the waste.

E. N. Harding (I. C.): The committee has made a good report. We will spend \$1,000 for oil and \$1,500 for waste. We are all trying to save that \$1,000 of oil and forget all about the \$1,500 we are spending for waste. If we use a little more oil we will all be better off.

Mr. Fuller: Those who are putting wedges in are furnishing waste for the other fellow. I know of a big concern that has not bought a dollar's worth of waste this year.

Cars come into this plant and the waste is removed, renovated and packed into other cars. You are furnishing the waste if you are putting in the plug. The packing houses won't use the plug, and the high speed freight trains are the packing house trains.

Plugs ought to be put in and everybody compelled to do it, or else they ought to be taken out. I don't believe there is any necessity for that plug.

The reason a lot of this waste is being brought forward in the box is rough collars. You make the journal smooth, but you take a rough cut off the edge of your collar, and that winds the waste up. The edge of the collar should be made smooth.

But really I think this Association is big enough to get on its feet and say one of two things. If you are going to call C a plug on the sketch, it is not a bad idea, but 90 per cent of the car men will pack the plug up to the center of the journal.

That is the plug the other fellow is taking out and putting in his vat and packing the other fellow's car, not buying any oil or waste himself.

Mr. Goodnow: I don't believe Mr. Fuller knows the latest

action that has been taken so far as handling packing company cars. Most of the railroads have insisted that they be put back in. We did, and if our instructions are being carried out, the cars that come to us have the plug in.

Mr. Kleine: Some roads still continue the practice of putting free oil in the box while others are trying to operate their cars wholly on prepared packing, taking the oil can away from the oilers in the yards. I would like to ask the chairman if that has been considered at all?

Mr. Downing: We don't look at those cars in interchange by raising up the packing box. We put the men right on the passenger cars with the floors up. They have instruments that test temperature. On the cars we are getting from the northwest we are lucky to get the stuff back of the collar, let alone in front.

Mr. Tatum: The whole question is to be considered from an economical viewpoint. Do we get a greater car mileage per heated journal with the plug? Do we have less journals to remove because of being heated? Are we operating the car with the plug in front of the journal for our railroads at a greater expense than if it were out?

Has the committee made a test of cars operating with the wedge omitted from the front of the journal? If so, from which was the greatest mileage per heated journal obtained?

To put a wedge in front of the boxes on all the cars in the United States means considerable money, and if it can be saved it behooves this convention to save it. The B. & O. has made comparative tests between the two. We found we got greater car mileage with the wedge out. We had less cars set out of trains on the side tracks. We had better packing underneath the journal. Our men did a better job. We were able to inspect it and see that it was rightly done better with the wedge out than when it was in. With a greater mileage per heated journal, with a reduction in the cost of lubrication, why should we have the additional expense of a wedge in front of the journal?

Mr. Brazier: *I move the committee's report be accepted and they be continued to make tests.*

W. H. Hall (C. R. R. of N. J.): The wedge in the front of the box is practically useless. I have tried doing without it for one year and we have had beautiful success. We can get more mileage, less hot boxes, and better attention with the plug out of the front of the box, than we can with it in. It gives the man who looks after the boxes an opportunity to see the condition. With a plug covering the whole front of the journal, they simply lifted off the box lid and look in, saw a lot of packing and closed it down again.

Now every box lid is opened on the arrival of a train and the conditions are noted. If the packing has worked out, it is pushed back in the proper position, and no wedge is used at all. We have had less hot boxes within the last year than we have ever known in the history of the passenger service of the Central New Jersey. The only thing that we are lacking in to-day is a good dust guard. We haven't got that, and it is essential. The majority of the boxes heat from the back end.

Mr. Goodnow: The committee was appointed for the special purpose of determining a method of packing boxes, so that the charge that has been in the rules for the past year would be taken care of. In continuing the committee and taking no action, the Arbitration Committee is left without any foundation for handling this charge for packing cars. *I would like to offer an amendment to Mr. Brazier's motion, that the committee's report be sent to letter ballot as recommended, if Mr. Brazier will accept it.*

Mr. Brazier: I will accept the amendment. *The motion was seconded and carried.*

Establishment of a Co-Operative Research Bureau



AT THE 1919 ANNUAL CONVENTION the following resolution was adopted: "Resolved, That Mechanical Section III of the American Railroad Association recognizes the need of a research bureau to investigate questions of mechanical practice which should have the co-operation of all the railroads, and urges the appointment by the chairman of a committee of eight to study the question and report at the next convention."

The following classes of work would come particularly under the scope of a research bureau:

Investigation and scientific rating of apparatus supplied by manufacturers for use on railroads, with a view to advising for or against the adoption as standard or recommended practice; formulation of practical and scientific tests for apparatus used by railroads; thorough investigation of new types of apparatus with a view of recommending or advising against their adoption in service; the study of apparatus now in common use to make suggestions as to improvements; analysis of the characteristics of material and engineering structures on which full information is now lacking; the making of scientifically accurate determinations of many disputed questions in railroad practice with a view to greater degree of standardization, and the investigation of foreign practice with a view to its adoption by American railroads, provided sufficient merit was found.

Information gained from the work of the bureau, as well as that secured from various test plants throughout the country, would be available at a central source. Investigations, as a rule, would be of value to all roads on account of including the complete range of road conditions. At

present many tests conducted by an individual road are valueless to other roads on account of being made to apply only to the local conditions of the road conducting the test.

Accurate tests would be conducted for the roads as a whole, which would tend to promote saving in time and labor and to increase in operating efficiency to a degree not now obtained. The bureau would make possible the establishment of the same tests for all roads, thus insuring that the use of "foreign equipment" would not reduce the operating efficiency of any road.

Engineering talent of all railroads and kindred organizations would be available to aid in any particular project. Large scale investigations would be possible, the expense of which would be prohibitive for one road under the present arrangements, but comparatively small when divided among the various roads throughout the country, as would be the case with the research bureau.

The work of the bureau will be of service to railroads as a whole through the investigations initiated by committees of the section. The cost of the service should be assessed in the usual manner on the member railroads of the association through regular appropriations by the executive committee.

The committee has collected a large amount of information and data covering the needs and requirements as well as the work to be performed by a research bureau, but desires to continue this study in its relation to the development of policies of the association before making a final report.

The report was signed by C. B. Young (Chairman), United States Railroad Administration; H. L. Ingersoll, New York Central; C. E. Chambers, Central of New Jersey; A. Kearney, Norfolk & Western; H. T. Bentley, Chicago & North Western; C. E. Fuller, Union Pacific; J. E. O'Brien, Missouri Pacific, and J. W. Small.

Discussion

In the absence of C. B. Young, the report of the committee was read by Mr. Chambers. The report was ordered received, printed in the record, and the committee continued.

Good Music in Abundance

A LARGE AUDIENCE OF CONVENTION PEOPLE attended the musicale on the pier Saturday night. The artists who entertained were Miss Dorothy Folis, soprano, of the Chicago Opera Company; Miss Jean Morrison, harpist; R. Norman Jolliffe, baritone; the Brunswick Quartette, of New York City, and members of the Taylor Orchestra. Informal dancing followed.

Sunday's entertainment consisted simply of a sacred concert in the music rooms of the Marlborough-Blenheim at 3.30 o'clock, given by the Albert Taylor Orchestra.

This evening another of the series of pleasant informal dances will be given on the pier, with special features promised by the Entertainment Committee.

Freight Car Situation

THE AMERICAN RAILROAD ASSOCIATION has resumed the publication of reports showing car surpluses and shortages, or "deferred car requisitions," as they are now termed. J. E. Fairbanks, general secretary of the association, on May 28 issued a circular including a summary of the reports, compiled by the Commission on Car Service showing an average of deferred car requisitions for the period May 1 to 8 of 79,272, as compared with 87,346 for the period April 1 to 8. The average surplus was 4,616, as compared with 6,370 in April. For the week ending May 23 the average of deferred car requisitions had increased to 98,936 and the average surplus had been reduced to 2,909.

Bad Judgment

THE SUPPLY CONCERN that deposited a neat little envelope on each seat of the Hippodrome in advance of the Monday morning meeting displayed more initiative than tact. It should not be forgotten that representatives of the railroads have a definite objective in attending these meetings. The exhibits will not be overlooked, ample time has been set aside for this and representatives of the supply companies have a splendid opportunity to demonstrate these interesting exhibits. However, they must not be allowed to trespass on the convention floor. The effect, if even a small number of the exhibitors resorted to this practice, would be to usurp most of the time of the meetings in perusing descriptive literature. A word to the wise should be sufficient.

Do Not Dismantle Your Exhibit

AS THE MEMBERS of Section VI—Purchases and Stores, will be in session both in the morning and afternoon on Monday and Tuesday and until noon on Wednesday, the R. S. M. A., at its meeting in the Greek Temple on Saturday, voted to keep the exhibition intact until 5 o'clock on Wednesday afternoon. This will give time for the purchasing agents and storekeepers to view the exhibits.

It is hoped that the usual confusion and partial dismantling of the exhibits on Wednesday afternoon will be avoided this year.

Ample police protection will be given to the pier and the contents of the booths will be entirely safe until they can be removed.

A Great British Manufacturer Here

F. B. T. TREVELYAN, managing director of Sir W. G. Armstrong, Whitworth & Company, Ltd., at Openshaw, Manchester, England, arrived in New York on the S. S. Imperator, of the Cunard Line, on Sunday. He expects to spend all of Tuesday at Atlantic City, making his headquarters at the office of the *Daily*, on the pier.

This is Mr. Trevelyan's first visit to America. His chief object in coming is to get first hand information about the extent to which pulverized coal is burned in this country and the success with which it has met where used in the various types of steel works' furnaces. The company uses pulverized coal at its Montreal works, where it has facilities for making the fuel; while at Manchester it is being tried in two furnaces. In the latter case it has showed a saving of 75 per cent over solid bituminous coal.

Prior to the war, Sir W. G. Armstrong, Whitworth & Company, Ltd., maintained two plants—one at Newcastle-on-Tyne, known as the Elswick Works and covering over 300 acres of land, and the other at Manchester, known as the Openshaw Works, spread over some 200 acres. It built battleships and merchant vessels, marine engines, machine tools, guns and automobiles, and made, among other things, armor plate, ammunition, steel and brass castings, drop forgings, tool steel and small tools. After war broke out the facilities of both plants were greatly increased and utilized exclusively for war work. The automobile plant was turned into a shell factory and new buildings for the manufacture of aeroplanes and air ships were erected; while the number of employees of the company rose to 120,000 with a weekly payroll of close to \$2,000,000. To give some idea of the work done by the firm during the war it may be stated that the output of guns ranging from 6-pounder tank guns to 18-in. 150-ton naval guns exceeded 13,000.

Since the armistice the company has been gradually getting back to a peace basis. The ammunition plant at Newcastle-on-Tyne has been changed into a locomotive building works with a capacity of 400 engines a year; while at Manchester a part of the plant is being converted into a shop for repairing from 8 to 10 locomotives a week. Also, the facilities for turning out machines for building and repairing locomotives and the semi-automatic machines on which the company specializes are being considerably enlarged. Its tool steel making plant is now producing tool steel at the rate of 2,000 tons a year.

The Elswick locomotive building plant has just been equipped with two Niles-Bement-Pond frame slotting machines, while to the Manchester repair shop are now being added the following Niles-Bement-Pond machines, the last of which is scheduled for shipment on June 25:

- 1 96-in. 100-ton wheel press.
- 1 12-in. double cutting off machine.
- 2 Pratt & Whitney turret lathes.
- 1 90-in. heavy driving wheel lathe.
- 1 90-in. standard Bertram driving wheel lathe.
- 1 60-in. standard driving wheel lathe.
- 1 No. 6 locomotive axle lathe.
- 1 84-in. heavy boring and turning mill.
- 1 73-in. standard boring and turning mill.
- 1 53-in. heavy boring and turning mill.
- 1 90-in. quartering machine.
- 1 No. 2 cotter and key seat drilling machine.

During the last 18 months Sir W. G. Armstrong, Whitworth & Company, Ltd., has been increased in size and its operations into other fields extended through the

addition of the following concerns: Pearson & Knowles, Rylands & Company, with works at Warrington; the Partington Steel Works (near Manchester), a comparatively new plant with open hearth and blast furnaces and a capacity of 7,000 tons of steel a week; Armstrong, Main & Company, Ltd. (formerly James Main & Company, Ltd.), makers of structural steel and builders of structural erecting machinery with works at Glasgow, Scotland; Armstrong-Siddeley Motors, Ltd. (formerly Siddeley, Deasey & Company, Ltd.), makers of automobiles; and Crompton & Company, Ltd., of Chelmsford, makers of electric motors.

The company has branch plants in Canada, France, Italy and Japan, and has in mind erecting locomotive building and repairing works in certain countries, substantially all of the machinery for which will be supplied from their shops in Great Britain.

Mr. Trevelyan is a son-in-law of Sir Philip Watts, for some 15 years naval architect to the British Admiralty and originator of the dreadnought type of battleship.

Chief Interchange Car Inspectors' Executive Committee Meets

AN EXECUTIVE COMMITTEE MEETING of the Chief Interchange Car Inspectors' and Car Foremen's Association of America has been called for three o'clock this afternoon at the Hotel Chalfonte.

A Southern Opportunity

ACENTRAL AND EASTERN SALES ORGANIZATION of good standing is expanding its business to include an office in the South and desires to broaden its line. The present organization is developed to handle freight and passenger car appliances for steam and electric roads. Manufacturers of any standard products in this line desiring representation in this field may obtain further particulars in Booth 1, *Daily Railway Age*.

Industrial Car Manufacturers Meet

THE INDUSTRIAL CAR Manufacturers' Institute has followed the practice established last year of holding its June monthly meetings at Atlantic City during the mechanical convention. All the meetings are being held in the Marlborough-Blenheim.

On Saturday morning, June 12th, the Board of Directors, together with the Executive Committee, held a meeting, in which was outlined a plan of work for the following six months. The Institute is now classified into groups, representing the several types of cars manufactured.

Group 1—Coal mine cars.

Group 2—Standard gage dump cars.

Group 3—All other types of standard gage cars used for industrial purposes.

Group 4—All narrow gage industrial cars other than coal mine cars.

Groups 2 and 3 held meetings Monday, and Groups 1 and 4 will hold their meeting to-day (Tuesday). All of the meetings have been largely and enthusiastically attended.

Semi-Annual Meeting of the Association of Railway Electrical Engineers

THE ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS held its semi-annual convention at the Hotel Dennis on Monday. The meeting was called to order at 10.15 A. M. by the president, L. S. Billau, of the Baltimore & Ohio.

During the course of the brief introductory remarks by President Billau the subject of the Association of Railway Electrical Engineers becoming a part of the American Railroad Association was again brought up. It will be recalled that this question was first introduced before the convention of the Association at Chicago last fall. At that time the railroads were under government operation, and hence this question presents slightly different aspects to-day from what it did then. There are decided advantages, however, to be gained from such consolidation, and there is every reason to believe that the Association of Railway Electrical Engineers will unite with the larger organization when certain changes have been made in the constitution of the latter.

Mr. Billau explained that in the event of the A. R. E. E. becoming a part of the A. R. A. the election of officers would be carried on by letter ballot, and that the choice of candidates would lie in the hands of a nominating committee. Furthermore, he stated, that such a committee would also be elected by letter ballot. Another change involved in rearranging the present methods of the A. R. E. E. to conform to the practices of the A. R. A. is the appointing of a Committee on Subjects from the members of the executive committee, this Committee on Subjects to present a list of subjects to be discussed for action the following year. Other minor changes were mentioned, among which was a possible change in the dates for the annual and semi-annual conventions.

Although quite a number of reports had been scheduled for the meeting, only three of them appeared in printed form. These were the Report of the Committee on Illumination, the Report of the Committee on Train Lighting and Practice, and the Report of the Committee on Electric Headlights. In order to economize in time none of the reports was read, the association members having been furnished with printed copies some time ago. The entire time was therefore available for discussion.

In submitting its progress report the Committee on Illumination stated: "The present basis of rating of train lighting lamps is to maintain the lumen output constant and vary the actual wattage as changes in efficiencies occur. For a number of manufacturing reasons it is desired to change the method to that in which the watts will remain constant and the light output vary with changes in efficiency, this being the standard method of rating for all other classes of multiple burning lamps."

The present and proposed ratings for the train and cab lighting lamps were presented in tabular form. In the new lamp schedule certain of the gas-filled Mazda type C lamps will be found, as the committee felt it was desirable to introduce this type of lamp for the reason that it would give better lighting without increasing the wattage consumption. During the discussion which followed this paper the question arose of the advisability of eliminating the 60-volt lamps and using the 30-volt lamps exclusively. In this connection, Mr. Andrusetti, of the Chicago & Northwestern, pointed out very clearly that there were many roads that were extensive users of the 60-volt lamps and to do away with this type would work considerable hardship on these roads.

In view of the fact that cab lamps are practically of

the same voltage as train lighting lamps, the question of such lamps being designed with the idea of interchangeability provoked considerable discussion. One manufacturer stated that his company was giving the subject of locomotive lamps special consideration in view of the special operating conditions to which they were subjected. His company, he stated, were striving to develop a lamp with a rugged filament that would withstand locomotive service, but it could only be done at the expense of efficiency which in this case he felt was justifiable. In general, it would seem that the cab lamps were not called upon to give the same quality of illumination as demanded of the train lighting lamps, and that, therefore, it would not be advisable to attempt to design a lamp that would be interchangeable.

The Report of the Committee on Train Lighting Equipment and Practice was the most lengthy of all the reports, covering 37 pages. Of this total, however, 26 pages were devoted to a general treatment of the subject, for the committee felt that it would be desirable to discuss more or less in detail the various features that were considered. This general discussion served to explain why certain items which form a part of a complete specification were omitted, and why other items that were included were finally decided upon.

Mr. Billau, chairman of the committee, admitted that the report had purposely been drawn up in a more or less flexible manner, in order that its specifications should not be so rigid as to interfere with practice that various roads had found necessary. In other words, considerable latitude was permitted in the specifications for axle generators, in order that certain roads could make the specifications to suit their needs. One of the points in the specification which called forth much comment, but which could scarcely be considered worthy of the time consumed on it, was—much as the condition involved would be decidedly rare, was Section 6 on page 33 of the report, which was worded to read as follows: "In case of open battery circuit the generator shall continue to carry the lamp load and the generator regulator shall automatically prevent an excessive rise of voltage on the equipment." Voluminous discussion arose over what might be considered as "excessive." It was finally disposed of by voting that the "generator regulator shall automatically prevent a rise of voltage above 20 per cent of lamp voltage." Other minor corrections and changes were discussed at too great length, especially when it is taken into consideration that the specifications as presented were intended to be flexible and to cover a wide variety of conditions.

The Report of the Committee on Headlight was also a progress report. The situation was presented by J. L. Minick, of the Pennsylvania, who is a member of the Headlight Committees of both the A. R. A. and the A. R. E. E. From present indications it would seem that much of the headlight equipment had still a long way to go before it could be considered as standardized in all of its features.

Mr. Andrusetti read a very brief report of the Shop Layout Committee, following which he requested the opinions of the members concerning the various electrical installations that had come to their notice.

The attendance at the session was excellent, about 75 members being present.

LOST

One beaded hand bag. Mrs. C. O. Taylor.

A plain gold cuff button, marked J. S. M. Was lost on the pier on Sunday. The finder is requested to return it to Secretary Conway's office.



American Railroad Association, Section VI, Purchases and Stores

First Annual Meeting Featured by a Broad Gage Address From the Chairman

THE FIRST ANNUAL CONVENTION of the American Railroad Association—Section VI—Purchases and Stores, opened with a session in the Hippodrome on Young's Pier, Atlantic City, Monday, June 14, 1920. H. C. Pearce, general purchasing agent of the Seaboard Air Line, called the meeting to order at 9.30 a. m. The convention was opened with a prayer by the Reverend Dr. Harris. Chairman Pearce then introduced Edward L. Bader, Mayor of Atlantic City, who welcomed the Purchase and Stores Section to Atlantic City. Following Mayor Bader's address, Chairman Pearce introduced James H. Waterman, who responded to the mayor's address as follows:

Address of Mr. James H. Waterman

I am sure that this body of men had no evil intention when they selected a "Water-man" to respond to a New Jersey Mayor. You will wonder what this splendid body of men are here for. Let me say to you that they represent 250,000 or more miles of railroad in this United States. Let me further say to you that the material they purchase, care for, distribute, and are responsible for each year, amounts to between a billion and a quarter and a billion and a half of money. They are cool, collective, thoughtful, energetic. They are everything that goes to make up strong men. If you want to build a railroad to-day, the first man, after you get your board of directors, that you would have to select would be the purchasing agent. You would have to get somebody to purchase your materials; then, following that you would have to get somebody to care for it, and that would be the storekeeper, so the Purchasing and Stores Department of the American Railway Association represents not only 250,000 miles of railroad but all the unapplied material on that railroad.

I wonder how many people of this country appreciate what the railroads mean to this country. First, in this country we must have stalwart men and women. They are the brains of the country. Next, we have the great resources of this country, our forests, our mines, our soil. The minds and the soil and the forest are the body, limbs, minds and feet of the nation. The men and the women are the brains, but the heart of the nation is the railroads of this country. What surprises me, as I go up and down the land, is that the business men are not first, last and all the time with and for the railroad. If the railroads go down to Washington and present a request for a better rate, a lot of commercial men or business men try to prove that they do not need these rates. To-day, the railroads of this country have got to have better facilities at their terminal, or the heart will

stop, and when that heart stops beating then remember there will be stagnation throughout the whole land.

Address by Chairman Pearce

The Railway Storekeepers' Association at its business meeting in Chicago, January 19, 1919, adopted a resolution and appointed a committee, authorizing the transfer of the activities of the Railway Storekeepers' Association to a Section of the American Railroad Association. The Railway Storekeepers' Association arranged to transfer the affairs of the Association to a temporary General Committee of the American Railroad Association, who in turn organized a section of the American Railroad Association, to carry on the work of the Railway Storekeepers' Association. A temporary general committee of 19 members, consisting of eight storekeepers, eight purchasing agents and three members of the Railroad Administration, was appointed to develop and determine upon a plan to carry on the work of the Association.

The General Committee has appointed 18 sub-committees to develop and recommend certain standard practices. The sub-committees consist of from three to eight members, composed of experienced, practical men, personally engaged in the work covered by the subject assigned them. They have been very active and excellent practical reports and recommendations have been submitted. This section is a co-ordinated part of the American Railroad Association. Its purpose is to consider and report upon all questions affecting the purchasing, selling and storing of materials and supplies and kindred subjects, and to recommend the best practices for carrying on the service of supply.

I may be permitted to digress a moment from my text to record a matter which is perhaps not well known to you all, and that is the organized, strong and practical support given the supply department of our railroads during Federal control by the Division of Purchases. This committee, or a similar one, was organized before the United States entered the war, for the purpose of procuring and conserving materials required for the maintenance and operation on our railroads. Its chairman was Henry B. Spencer, afterwards chairman of the Central Advisory Purchasing Committee and later Director of the Division of Purchases. On this committee was George G. Yeomans, who has given the subject of stores more hard, thorough and exhaustive analysis than anyone in this country. Mr. Yeomans has viewed this subject from all angles. A graduate of one of our famous eastern colleges, he entered railway service with a trained

and open mind. When he reached the position of purchasing agent of one of the largest systems of railroads in this country he could very easily and naturally have sat back and looked upon the storekeeper as the man who delivered supplies over the counter to the users, as so many have done. But he chose to investigate matters on the ground for the purpose of determining for himself the character of the information furnished him, from which knowledge he expended millions of dollars annually, and he discovered the reason why the supply department is recognized to-day as an important and specialized department of our railroad organization, co-ordinate with the transportation, mechanical, engineering and traffic departments, instead of being subordinate to one of them.

The railway supply officers of this country owe a great deal to Henry B. Spencer, Samuel Porcher, George G. Yeomans and E. J. Roth. The railroads, through the American Railroad Association, will expect this Section to present to them the best and most economical plans for dealing with all questions of supply, even to the point of considering and determining the financial condition of their properties. In order to do this we must have the benefit of the best practices and fullest knowledge, and it is believed that this can be accomplished by appointing sub-committees of thoroughly trained men to develop and determine all phases of the subject, reporting to a general committee of experienced and practical men from all branches of the service and from different parts of the country. On this general committee will rest the responsibility of seeing that only practical and workable recommendations are submitted, and in order to get the fullest expression, these reports will generally be presented to all members for full and free discussion.

This now brings me up to the real purpose of this meeting, which is to discuss and dispose of all the different subjects that have been submitted, and it is the hope and belief of your chairman that you will devote yourselves to the work in an earnest and helpful manner. The committee has arranged the program in such a way that by close application we can conclude the business of the convention Tuesday night, giving us almost an entire day to visit the exhibits. In order to carry out this plan in a systematic manner, each member has been furnished a printed copy of each report with the request that all recommendations, changes, suggestions, etc., be reduced to writing. The committee having the subject in charge will be called to the platform and its chairman and members will be prepared to discuss any recommendation, suggestion or change which may be brought forward by any member. It is hoped in this way to give every member an opportunity to present his views without getting into a general discussion of other subjects. By con-

centrating on the one thing and having the benefit of the experience of the chairman and committee who formulated the report, we should be able to dispose of the subjects promptly and give everyone an opportunity to discuss them. Members will please bear in mind that while our time is limited, we desire to give everyone an opportunity to present their views, but it is equally desirable that unrelated subjects should not be introduced into the discussion.

Supply department officers of all grades have a great responsibility confronting them. They have been given the plan, the purpose and the machinery. It is for them as individuals to show they are worthy. If we are not big enough and broad enough to not only know our own business better than anyone else, and strong and willing enough to defend it against attacks, and wise enough to recognize and correct its faults, we will fail and deserve to. I have confidence enough in your strength of character, training and good sense to believe you will rise to the occasion and show the owners and executives what men with proper training and application can accomplish when organized and properly supported and directed.

We must so conduct this meeting and ourselves as to reflect credit to the organization and all of its members.

At the conclusion of his address the Chairman read the following communication from R. H. Aishton: "It has been my intention to attend the entire session of the Purchases and Stores Section in Atlantic City, and I have been looking forward to it with a great deal of pleasure. However, I now find that I am going to be disappointed. The railroad situation at the present time is such as to require my presence in Washington, and I have been obliged, therefore, to remain in Washington, although I am going to try to steal away for at least a day, so that I may be present at one of your sessions."

The Chairman: The minutes of the annual meeting of the Railway Storekeepers Association, 1919, were taken up as next in order. These proceedings have been printed and distributed to the members of the Railway Storekeepers Association, and the chairman asked that a motion be made that the minutes be approved. *It was moved that the minutes be approved. This motion was carried.*

Obituaries

Following the usual custom, the chairman appointed a committee to prepare a memorial to the following members who have died during the past year: Eugene Chamberlin; Charles D. Norman; W. R. Shoop and B. F. Schwaner.

A tribute to the personality and life work of Eugene Chamberlin was delivered by W. F. Jones. J. W. Gerber commented appropriately on the character of Chales Dana Norman and the chairman spoke feelingly of the loss sustained by the association in the death of W. R. Shoop.

Report of the General Committee

IN ITS REPORT the committee outlined the steps taken at the meeting of the Railway Storekeepers' Association in January and May, 1919, which led to the establishment of Section VI—Purchases and Stores, of the American Railroad Association.

At the meeting of the executive committee of the Railway Storekeepers' Association held at New York on May 15, 1919, a temporary general committee composed of representatives of the association was selected to carry on the work of Section VI until the general meeting was held. Tentative rules of order for the section, based on the constitution and by-laws of the Railway Storekeepers' Association and the rules of order of the American Railroad Association, were formulated. Arrangements were made for the transfer of the affairs of the Railway Storekeepers' Association to the general committee of Section VI of the American Railroad Association, which selected the committees, appointed committee members and made other provisions for carrying on the work.

The section was organized at a meeting of the temporary general committee held at New York on May 16, 1919, the chairman, vice-chairman, secretary, assistant secretary and sub-committees being appointed. Since that meeting H. S. Burr

has resigned as chairman and H. C. Pearce has been elected to fill the vacancy.

The membership in the former Railway Storekeepers' Association have been transferred to the Purchases and Stores Section of the American Railroad Association. Representative members have been appointed by the railroads and others on the membership list have been elected to affiliated or life membership of Section VI.

The report of the committee included the report of the secretary-treasurer as shown on the following page.

The tentative rules of order for the section were also included in the report as a separate exhibit. The committee submitted as candidates for the Committee on Nominations the following: J. W. Gerber, (chairman) general storekeeper, Southern Railway, Washington, D. C.; W. A. Summerhays, purchasing agent, Illinois Central, Chicago; W. C. Bower, general purchasing agent, New York Central, New York; F. W. Taylor, purchasing agent, Southern Pacific, San Francisco, Cal.; J. F. Marshall, purchasing agent, Chicago & Alton, Chicago. Alternates: C. A. How, general purchasing agent, Missouri Pacific, St. Louis, Mo.; J. G. Stuart, general storekeeper, Chicago, Burlington & Quincy, Chicago; A. A. Good-

child, general storekeeper, Canadian Pacific, Montreal, Canada; H. A. Anderson, assistant purchasing agent, Pennsylvania System (Eastern region), Philadelphia, Pa.; U. K. Hall, general storekeeper, Union Pacific, Omaha, Neb.

The report is signed by H. C. Pearce (chairman), (S. A. L.); W. G. Phelps, (Pennsylvania); J. P. Murphy, (N. Y. C.);

SECRETARY-TREASURER'S REPORT

From January, 1919, to June, 5, 1919.

Active Membership January, 1919.....	587
New members received (including 121 taken in at January Meeting).....	154
Total Active Membership.....	741
Honorary Members.....	12
Total Membership June 5, 1919.....	753

RECEIPTS

Balance, Cash in Bank January 22, 1919.....	\$544.56
Receipts since that date:	
Dues.....	\$762.05
Initiation.....	770.00
Matl. Classification.....	225.00
Proceedings.....	15.00
Interest on Liberty Bonds.....	22.09
Committee, January Meeting.....	4.00
	1,798.14
Total Receipts.....	\$2,342.70

DISBURSEMENTS

Bills paid as audited since January Meeting.....	1,770.40
Balance Cash in Bank June 5, 1919.....	\$572.30

CASH ASSETS

Cash on hand in bank.....	\$572.30
Liberty bonds—3d issue.....	500.00
Liberty bonds—4th issue.....	200.00

Total Cash on Hand and Bonds.....\$1,272.30

The books of the Secretary-Treasurer were audited, and the cash assets, above stated, were transferred to the accounts of the American Railroad Association.

H. S. Burr, (Erie); S. Porcher, (Pennsylvania); G. G. Yeomans, (N. Y., N. H. & H.); A. W. Munster, (B. & M.); E. J. Roth, (F. G. E.); E. W. Thornley, (B. & O., Western Lines); B. T. Jellison, (C. & O.); G. E. Scott, (M. K. & T.); H. H. Laughton, (Southern); W. A. Hopkins, (Mo. Pac.); F. D. Reed, (C. R. I. & P.); H. E. Ray, (A. T. & S. F.); F. A. Bushnell, (G. N.); D. C. Curtis, (C. M. & St. P.); E. N. Bender, (Can. Pac.), and E. J. McVeigh, (Grand Trunk).

Discussion

The Secretary read the report of the general committee. There are some changes recommended in the rules of order which were read by the Secretary as follows: *One:* The General Committee shall consist of 16 elective members, including the chairman and vice-chairman. The elected members shall be divided equally between the purchase department and the stores department. *Two:* The chairman and the vice-chairman of the Section shall be elected by printed ballots each year. The candidate receiving the majority votes cast shall be declared elected, and shall hold office for one year until his successor shall be appointed. *Third:* The annual meeting of the Section shall be held in May of each year at Chicago, Illinois. The time of each meeting shall be given by the committee elected at least three months in advance.

It was suggested by Mr. Yeomans that the three proposed changes be passed on separately instead of altogether and the first two changes were adopted by vote. Motion to adopt the third change making Chicago the permanent location for future conventions of the Section precipitated a lively argument on the floor:

Discussion on Location of Annual Meetings

M. E. Towner (Western Maryland): I have been able to attend the Mechanical Convention this year and see the exhibits. The service of supply is so integral a part of the section of the operation of the mechanical and other departments, and there are so many interests absolutely in common, that I do not see how we can change the meeting place to get away from other interests at their conventions, and be as successful as we might be. Personally I shall be very sorry to see a change in our meeting place. I find in connection with the supply department of the Western Maryland, that we must be in constant contact with the mechanical department for we are not only

interested in the obtaining of material, but in the care of that material from the time of its purchase until it is used. I am thoroughly imbued with the idea that our convention should be held in contact with the mechanical convention each year, and I trust that our meeting place may be where they are to meet, which will be presumably here.

C. D. Young (P. R. R.): It seems to me that this is a most unusual procedure for insertion into our laws designating the location for the meetings. That would mean, if the committee of sixteen, for some reason did not care to hold the meeting in Chicago, and in May, it would be very difficult to change the place of meeting. I would like to express the thought that we should have the greatest flexibility for the general committee to designate where and when we shall meet. There may be circumstances in the future which would almost make it undesirable to go to Chicago, or perhaps to meet in May. I do not believe that any of the other sections of the American Railroad Association so designate their place of meeting in this hard and fast manner, and I hope the original motion will not prevail.

M. E. Towner: Not only the opportunity but the need of railroad advancement to-day is more education, and it is an important question to get all the members together where they can learn, which is here. (Applause.)

J. H. Waterman: Unless you do something that will interest and bring the young men in the stores department to attend Section VI when it meets you will soon have no Section VI. The life of this organization depends not only on the old heads, but it depends on the young men, and you want to have this meeting, at least some times, where many of the young men who are not known, but will be known in the future, can attend the meeting. It is very nice to meet at Atlantic City. I do not know of anything that would prevent my meeting here, but there are hundreds of storekeepers that would meet in Chicago, St. Louis, Minneapolis, or some of those middle west cities that can never come to Atlantic City. In the name of the young storekeepers of this country, I plead with you not to tie it down to Atlantic City.

G. G. Yeomans (N. Y., N. H. & H.): The amendment that was proposed by the general committee, was not merely snap judgment. Every one who has spoken on this subject, has had something to say about the educational advantages of holding the meeting in Atlantic City. The men we want to educate are the rising generation, the men who are going to take our places. We want to be in the position to reach as many of these men as we possibly can. It is almost out of the question to expect storekeepers from the Pacific Coast, California, Arizona and Texas to cross the entire continent in order to attend one of these meetings, no matter how many pieces of machinery they may see working under conditions which are calculated to prove that they could not work wrong if they tried. It is not that sort of education that we want for our storekeepers. We want to have them learn how to handle, how to distribute, and how to care for and to account for material. They might come here and spend their lives at an exhibition of this kind, and go away, knowing less than they did when they came. We want to have them come to a place where they will get the education along the lines that their business requires, and we want to make that place of meeting so convenient that the largest possible number of men can come to that meeting with the smallest possible expenditure of time.

The educational features of a meeting like this are just as great outside of the meeting hall as they are in the discussion on the floor. It comes through the interchange of opinions, ideas and discussions that go on among these men who are brought together from all parts of the country, after the meetings are over, when they are sitting around in the evenings, talking over what they have heard in the meetings, and a great many of them getting new ideas, and giving new ideas to each other, which they never can do if they are going to wander around in a sort of desultory way looking at things they do not understand, and seeing the wheels go round. The suggestion of the meeting at Chicago was made because Chicago is the most central point of a size large enough to furnish comfortable and convenient accommodations for all of the people that we expect to come there, and we ought to have it there.

I am not at all saying anything against the value of these exhibits. I do believe they are valuable. I do believe that the men to whom they are specially valuable—the men who are directing the operations of the purchase and stores section—can spend time to come here and look at them without having the entire body brought here for that purpose.

I do not believe that anybody would need more than just one look at the electric sign on the north side of the Pier to get the idea of where the Purchase and Stores Section of the American Railroad Association stands to-day in the estimation of the people who have been holding their convention here for a good many years. It was an eye opener to me, and I believe that this section is large enough, is important enough to the interests of the railroads of this country, to stand on its feet, and if it is not large enough now, the sooner we make it large enough, the sooner we make our weight felt and our importance felt by the work that we can do, the sooner we are going to occupy a more prominent place in the railroad world. The way to do that is first to get all of the men possible to attend these meetings, and then to concentrate when they are at these meetings on the work in hand. I hope you will think pretty well before you vote, first, as to changing the month in which the convention is to be held, which has been the

month in which all of the Railway Storekeepers' Association meetings have been held, and I hope you will consider very strongly the thought of keeping the meeting places as central as possible and as available as possible to the great body of men who cannot attend these conferences unless it is made convenient for them to do so.

W. F. Jones (N. Y. C.): I believe that instead of changing the meeting place of our convention that we should change our policy, or in other words, be more emphatic in our policy toward the rank and file of the membership of the old Railway Storekeepers Association. I believe there are a great many of the storekeepers that feel they are not welcome in this new association that we have organized. Let us go out with this body of men at the outlying points and make them just as welcome as the purchasing agent or general storekeeper, and we will have an attendance.

An amendment to the amendment submitted by C. D. Young reading as follows, was adopted:

The annual meeting of this Section shall be held each year, the time of such meeting shall be designated by the General Committee at least three months in advance.

It was moved and seconded that the General Committee's report as a whole, which includes the rules of order as amended, be adopted. This motion was carried.

Organization of the Service of Supply

THE GENERAL COMMITTEE submitted the following plan for the organization of the service of supply:

In view of a possible reorganization of the corporate forces at the termination of federal control, the General Committee submitted for the consideration of the Executive Committee the following recommendations with respect to carrying on that portion of the railroad work relating to the service of supply.

The maintenance of necessary stocks of materials and supplies for railroad needs, involving the investment of 35 per cent of the gross earnings, and the care and custody of the material represented by this investment, as well as the necessity for a more effective and systematic means of controlling it than has hitherto generally existed on railroads, should be recognized as of sufficient importance to demand the best efforts of a department organized exclusively for this service. The officers and employees of such department must in all respects, rank with officers and employees of the other operating departments, both in the divisional and general organizations. It requires as long a training and as much experience and skill to produce a competent storekeeper as it does to create an efficient official of similar responsibility in any other department of the service, and unless this is recognized, men with the training and knowledge necessary to produce results cannot be obtained, nor can an effective staff be maintained in competition with the other branches of the service. These recommendations are made with the certainty derived from past experience that the operating expenses of the railroads will thereby be substantially reduced and that a definite knowledge of the results of operation with respect to this particular investment, which is not at the present generally available, will enable executive officers to exercise a closer supervision over the action of those responsible for this work than is possible under any other form of operation.

First.—The committee recommends the maintaining of such an organization on all railroads, along the following lines: The purchasing department shall be in charge of a general purchasing agent or purchasing agent. He should buy all material and supplies of every description required for use by the railroad, including new equipment, fuel, rail, bridges, ties and timber, dining car and restaurant supplies, and sell all scrap or obsolete material, including equipment.

The stores department shall be in charge of a general storekeeper, who shall be responsible for the custody, care and distribution of all material not actually in use, as well as for the quantity of material on hand, and shall have direct charge of all material not in actual use, including scrap and second-hand material and the reclaiming of usable material, and of the storehouses and storage yards or other places where material is stored. He shall also have charge of and be responsible for the primary

accounting for the receipt and disbursement of all material, and shall have under his charge and on his payroll all storekeepers and all others more than half of whose time is devoted to the handling or accounting for material.

Second.—The committee recommends that the inseparable connection between the purchasing and stores department should be recognized more clearly and that both these branches of the service should be under the control of a single executive officer in exclusive charge of supplies, or that where so large an organization is unnecessary, the entire work should be under the general charge of the purchasing agent, and that the officers in charge should be selected for their fitness for the organization instead of modifying the organization to fit the individual. This form of organization has the advantage of concentrating responsibility and authority over unused material in the hands of a single department, which can be held to strict accountability and escapes the pitfalls of divided responsibility which has heretofore been the cause of untold expense.

In this connection, the committee also recommended the uniform adoption of the specific titles for designating officers and employees of the stores department on different railroads.

Third.—The committee strongly recommends and urges the adoption of a uniform method of accounting for materials and supplies by all railroads, in accordance with the standard material classification prepared and recommended by the Railway Storekeepers' Association, and particularly that the primary accounting for all material be done by the stores department organization and that the standard form of monthly material stock report selected by the Railroad Administration as the most effective and valuable report in use by any railroads prior to Federal Control, be adopted and made the uniform standard of the railroads when they return to private management.

This report presents the operating statistics of the stores department in such concise and definite form that by its use the executive officers can easily maintain as effective control over the operations of the stores department as they now do over the operations of all of the other departments.

Discussion

The Chairman: We are going to give the fullest possible opportunity for discussion, consistent with the disposal of the business. Five minutes is given to each for discussion, and as much longer as the chair may desire.

A. A. Goodchild (C. P.): The gist of this plan or reports appears to me to be summed up in recommendation No. 2. The recommendation is one which invited the most serious consideration of every member of this section of the A. R. A. and I for one, would not like to see it pass the convention in its

present form. It is to be admitted that the stores and purchasing departments have much in common, but why mention the "inseparable connection" between them any more than between the stores and mechanical department, B. & B. department, road department, transportation department, or the accounting department; the duties pertaining to each of these departments are separate and distinct and our organizations as a general rule have been based on this fact. There is just as much reason for the stores controlling the purchasing department or any of the service departments supervising any of the others as there is in this proposition. I do not view the question from the standpoint of any particular railroad system, simply as a railroad man, and as a general proposition for the base organization of the material and supply departments of a railroad, and I consider that any such enlargement of the duties and responsibilities of the purchasing department is unwarranted and inadvisable.

The question is one of most vital importance to every railroad management on the continent for I am sure it is not conducive to good purchasing or good storekeeping to have anything but the utmost freedom of jurisdiction, one department from the other, and under no circumstance should the officer who purchases material have any jurisdiction over the officer responsible for ordering, receiving and handling it. The plan has been tried and found wanting well within the knowledge of many at this convention, and furthermore my impression is that the Railway Storekeepers Association have already placed themselves on record in so far as the jurisdiction governing the stores department is concerned. In any event it was, prior to the Federal organization, the general practice of our railroads for the general storekeeper to report to the general manager or vice president in charge of operation.

I do not think it would be wise to recommend one general officer even with the official position of vice-president to take over these two departments as a special line of duty for the simple reason that the general storekeeper alone should be held responsible for material balances which should be problematical at least under a single jurisdiction.

I would suggest that the duties of the general purchasing agent are onerous enough. Purchasing and following up deliveries of material, keeping themselves advised of market conditions, etc., in other words, meeting the requirements of the stores department that they in turn may fulfill their function of supplying the requirements of the various departments of the railroads is quite a large order.

G. G. Yeomans: I do not care to take up the time of the meeting by any elaborate defense of the suggestion of the General Committee. I can only say that this was a subject of very considerable and thorough discussion by the General Committee before the plan was formulated. It was thought advisable that some plan should be recommended to the executive officers of the railroads as to the best plan in the opinion of the men who were actually engaged in the service of supply under which an organization could be perfected that would bring about the best results for the railroad in the way of conserving its investment in material.

There was a good deal of opportunity in Washington for us to see the manner in which different railroads were investing their funds and how it might be improved on considerably. It was found by careful analysis and investigation that certain railroads in the country were procuring better results with a small investment of money than other railroads. The committee naturally looked into the question of the methods and manners by which those results were produced, and it was found that the best results were being obtained from railroads which organized along the line of the committee's recommendation. In other words, the recommendation was made as the result of experience, and not at all as a purely theoretical idea which germinated in the brain of the committee. The plan was approved by the committee with the exception of one vote. There was one negative vote, the rest were all in favor of the plan suggested. The committee felt warranted in submitting it to the meeting as a basis for discussion in regard to the question of the inseparable connection. That connection, gentlemen, exists. It is a fact, and no amount of talking can make it any other than a fact. There is an inseparable

connection between the two departments, more so than between any other departments on the railroads. There is a connection between the men who will procure the material and the men who will distribute it, that is very much closer than any connection between the Purchasing and Stores Section and the users of the material, no matter what department they belong to.

The question as to subtitles to clerks was another of those questions that was very carefully thought over, and it was recommended that subtitles should not be used, the idea being merely to allow employers complete freedom with respect to any changes in their forces and in their shifts from one task to another.

The Chairman: I am going to call on members of the General Committee who are familiar with the formulation of this report. One of the men who is in a somewhat similar position to our Canadian friend, is on the Pennsylvania Lines. We are going to get all there is in this thing during this meeting. I am going to call on Samuel Porcher (applause).

Samuel Porcher (Pennsylvania): This report made by the General Committee was chiefly in the effort to bring the importance of this subject more thoroughly before the management of the railroad. A careful reading of the report will show you it was formulated at the time of Federal control. We are not under Federal control now and perhaps under these circumstances it may be necessary for this convention not to adopt a report that will be so specific in detail as to be unapplicable to some particular road. I think it may be possible that with slight alterations in this report, to still emphasize the necessity and desirability of this feature of making the service of supply a more important one than it has been, and one equal to the importance that it actually deserves at the hands of the railroad managements. I might say that in the second paragraph it might be possible to obtain all that we desire and not to make anything impossible if it were arranged like this:

We recommend that the inseparable connection between purchasing and stores departments should be recognized more clearly and that both branches of the service should be in charge of a single executive officer and that the officers in charge of these departments should be selected for their fitness for the organization, instead of organizing the organization to fit the individual. This form of organization has the advantage of concentrating responsibility and authority over unused material which can be held to strict accountability.

H. S. Burr (Erie): The question seems to hinge more particularly, as it runs in my mind, not to whom the general storekeeper, whoever he may be, is to report. I do not believe it makes much difference. Personally, I would prefer to have the stores department head report to an operating officer, and I believe if he is the right kind of a storekeeper it would not make much difference. I have no specific recommendations to make. The plan as outlined was specifically arranged, and it embodies the best in the way of handling this material.

E. W. Thornley (B. & O.): I was fortunate enough during the time of Federal control to represent the Government in the Allegheny region, and was able to see first hand the condition brought about by working under many forms of organization. I feel confident in stating that we obtained by far the best results when the stores department was made a part or parcel of the purchasing department. There seems to be a very close connection between the departments and we were able to control the material investments with satisfaction to everybody concerned on the roads that were working under that form of organization.

H. H. Laughton (Southern): Our organization is not working under this plan, nor do I believe that it is best. I favor distinct separation between the stores department and the purchasing department, just as much as between the transportation department and the stores department. I believe that the function of the purchasing agent is the procurement of material. I believe that we should buy on requisition from the stores department, which should be held responsible for the material, its balance, its issue, its accounting. I would not put them under the purchasing department, rather I would put the purchasing under stores department.

W. A. Hopkins (M. P.): On the Missouri Pacific we have had this form of organization for about ten years, and it

has been thoroughly practical in every respect. We feel that by reporting to the purchasing agent we have a head of the department that can view it from all angles and get better results than from segregating the departments and reporting to some operating officer.

F. D. Reed (C. R. I. & P.): I always believed in being practical, and I do not believe any of the purchasing agents that are here to-day will concede that they ever had more difficulty in securing material than they have at the present time, or have had in the past year. Assume for instance, a general storekeeper reported to the general manager or some general superintendent, and it becomes desirable or advisable, from the financial, as well as operating standpoint for the railroad to buy material, four, five or six months in advance. If the general storekeeper did not report to the purchasing agent, the purchasing agent would say to the general storekeeper, "I am not going to stock up my store with that stuff for you. I am going to get it when I want it." The director of purchases in most railroads reports to the executive officer who is fairly familiar with the financial conditions of the property, knows what money must be spent or has to be spent and can be spent, therefore he is more qualified to handle the expenditure for material than any other individual or officer on the railroad. I started in on railroad as a car repairer. I have been in the mechanical department. The whole aim when I was in the mechanical department was to get all the material we could get and have all we could get and have it on hand at all times, regardless of how much money was tied up in the material. When I was in the stores department, as a general storekeeper, I had that thing to fight, to keep the master mechanic, master car builder, car foremen and everyone else from hogging all the material, and let some other fellow go without it. And those are conditions that the purchasing agent can control through the general storekeeper better than any other organization. We have had this organization on the Rock Island for years and it has worked out nicely. We all work together and in picking store department representatives, we try to get diplomats. We cannot get them all to be diplomats for the salary we are paying, but we are doing the best we can, and I maintain that the most economical and most practical method is for the purchasing department to be under one organization.

J. G. Stuart (C. B. & Q.): We have been working over twenty years under the plan as proposed under this recommendation, that is, that the general storekeeper reports to the purchasing agent. We have found it very successful. It is possible that there are other ways that might be even more successful, but so far we have not been able to find one. Perhaps one of the troubles in this proposed plan is that the purchasing agent might endeavor to exercise such a close supervision over the general storekeeper that the purchasing agent would virtually be general storekeeper. If he attempted to do that, my opinion is that he is going to fail. If, however, he has a general storekeeper and he has confidence enough in the general storekeeper to expect that the general storekeeper can operate and take care of his own department properly, reporting to the purchasing agent on important things, conferring with the purchasing agent on important things, and advising with him as to the length of time necessary to maintain a stock, to get the opportune times to buy, then I am satisfied that we will have an organization that will certainly be better than these others. I remember when we did work under the other system and I am going to tell you that the store department on the Burlington before it was taken over by the purchasing department was not really a store department, it was a little side issue of the mechanical department.

E. N. Bender (C. P.): Our organization is somewhat different than you have on this side. The practice is that the stores requisitions are approved by the vice-president and

sent to the general purchasing agent for execution. He has no direct control over the stores department, excepting that he has the right to suggest to the general storekeeper the issuing of requisitions when he considers the market is proper at the time for purchases. Beyond that he has had no direct control over our stores department, but I am heartily in accord with the suggestion which was made that the purchasing agent should have the same control over the stores department in Canada as in the United States.

H. E. Ray (A. T. & S. F.): This discussion has been very interesting, but it seems to me in a way somewhat futile, because whether the association passes this paragraph or not, it occurs to me that this inseparable connection between the purchasing agent and the store department will continue. The two interweave so very closely that I do not see how a well organized railroad could very well have any other kind of an organization. With us we have this organization as has been recommended in paragraph two for many years. The thought that we could find anything better never occurred to me, because of the close co-operation that has always existed between the purchasing agent and the stores department. There has been no very marked line of demarcation between the two, never has seemed any occasion why there should be.

W. G. Phelps (Pennsylvania): Until two years ago we had what would hardly be called a stores department because we had not any general storekeeper, as I have been raised in the operating department. Consequently, I thought there was no other department except the operating department. Naturally, the general storekeeper, if reporting to anyone should report to the general manager. However, when it was decided that the general storekeeper should report to the purchasing department we at once established a department along those lines, and it worked efficiently.

A motion was made to amend the amendment as follows: In the first paragraph of the plan submitted by the general committee, strike out the word "primary" in the fourth from the last line of the second paragraph making it read "he shall also have charge and be responsible for the accounting, for the receipt and disbursement, etc." Second, change the wording to read as follows: "We recommend that there shall be the closest co-operation between the purchasing and stores department, which should be recognized more clearly and that both of these branches of service should be under the control of an executive officer in charge of supplies." That eliminates the word exclusive and eliminates the wording, the inseparable connection, and that eliminates the balance of that paragraph. The next paragraph: Strike out the words, "In this connection," and start the paragraph to read: "We also recommend, etc." Third: Following change to be made, making the paragraph read as follows: "We recommend and urge the adoption of a uniform method of accounting for materials and supplies by all railroads." That "the material accounting be done by the stores department organization and that a standard form of monthly report as may be adopted by the American Railway Association be used." Change the wording of the last paragraph, third, as follows: "This report should present the operating statistics of the Stores Department in such a concise and definite form that their use by the executive officer will readily maintain an effective control over the operation of the stores department as they now do over the operation of other departments."

This motion was seconded and carried.

It was moved that this report be referred back to the General Committee, together with the amendment to the amendment, and that all the information received on this subject be referred back to the General Committee for consideration and revision. This motion was seconded and carried.

Report on Stores Department Book of Rules

THE COMMITTEE unanimously recommended the adoption of the Standard Book of Rules as adopted by the Railway Storekeepers' Association at its 1914 annual meeting with the following suggested changes:

Part II—Instructions Governing Use of Stock Book

The committee recommends that Part II, Sections 1 to 6, inclusive, as published in Form ST 5, Rules for Railroad

Stores Department Operation by the United States Railroad Administration, be substituted for Part II, Sections 1 to 7, inclusive, as originally adopted by the Railway Storekeepers' Association and published in their Proceedings of 1914.

It is also recommended that Section 7 of Part II in Form ST 5 be included in Section 6, Part II, as Paragraph (f).

The committee further recommended that a new Section 7, Master Stock Book, be added, as follows:

Part II. Section VII—Master Stock Book

(a) Key sheets showing the uniform arrangement and description of material items will be used in all stock books and in the master stock book in the general storekeeper's office.

(b) Stock book sheets, Form RSA-21, will cover a period of two years with the current twelve months exposed and the following twelve months on the reverse side.

ing other data in spaces Nos. 2, 3, 4 and 5, insert a carbon sheet between the stock book sheet Form RSA-21 and coupon sheet RSA-21-A. Trace over the figures in space No. 1 on sheet RSA-21 and enter the data for spaces 2, 3, 4 and 5.

(g) When all data has been shown detach the coupon from RSA-21-A and send it to the general storekeeper with monthly orders for each class of material. Care should be taken to see

MASTER STOCK BOOK FORM R.S.A.-21-B						
Chicago	Omaha	Denver	Kansas City	Quincy	Burlington	Keokuk

NOTE—This Form to be 13 $\frac{3}{8}$ inches high; width regulated by number of stores. Print names of one-half the number of stores on one side—the rest on the reverse side.

Master Stock Book Form for General Storekeeper's Office

(c) Key sheets are to have the same information printed on both sides and are to be inserted in the stock book between the sheet showing the first six months period and the sheet showing the second six months period of the year.

(d) When the stock book is opened, the sheet covering the first six months period, showing January, February, March, April, May and June from left to right, is to be to the left of the key sheet, and the sheet for the last six months period for July, August, September, October, November and Decem-

ber, starting with July and reading from right to left, will be to the right of the key sheet.

(h) The master stock book Form RSA-21-B kept in the general storekeeper's office, is to be arranged in the same class, page and item order as stock book Form RSA-21 used at the storehouses. Key sheets are to be placed in the master stock book between sheets Form RSA-21-B, on which a place is assigned for each storehouse. The space assigned to each

COUPON SHEET R.S.A.-21-A																	
Class			Class			Class			Class			Class			Class		
Page			Page			Page			Page			Page			Page		
Store			Store			Store			Store			Store			Store		
JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
Data	Quan-	Requi-	Data	Quan-	Requi-	Data	Quan-	Requi-	Data	Quan-	Requi-	Data	Quan-	Requi-	Data	Quan-	Requi-
1 to 5	Ordered	No.	1 to 5	Ordered	No.	1 to 5	Ordered	No.	1 to 5	Ordered	No.	1 to 5	Ordered	No.	1 to 5	Ordered	No.
1			1			1			1			1			1		
2			2			2			2			2			2		
3			3			3			3			3			3		
4			4			4			4			4			4		
5			5			5			5			5			5		
1			1			1			1			1			1		
2			2			2			2			2			2		
3			3			3			3			3			3		
4			4			4			4			4			4		
5			5			5			5			5			5		
1			1			1			1			1			1		

NOTE—Size of Form—10 $\frac{3}{4}$ inches wide. This includes binding margin of 1 $\frac{1}{2}$ inches, punched for 2 hole post binder—form 13 $\frac{3}{8}$ inches high 10 Groups of oblong spaces numbered 1 to 5 on each sheet.

Coupon Sheet for Stock Book

ber, starting with July and reading from right to left, will be to the right of the key sheet.

(e) To provide a report and record for the Master stock book in the general storekeeper's office, there should be inserted under each sheet RSA-21 of the stock book, a coupon sheet, form RSA-21-A, similar in every respect to Form RSA-21, except that it is printed only on one side and perforated between months. (A copy of form RSA-21-A is shown herewith.)

(f) Monthly stock book inventories. The amount on hand is to be shown in space No. 1 on Form RSA-21. When enter-

store should be the same width as the coupons that are sent in by the storekeepers. The width of the master stock book will be regulated by the number of stores from which coupons are received. (A copy of form RSA-21-B is shown.)

(i) Coupons RSA-21-A should be pasted in the proper place in the master stock book in the general storekeeper's office immediately upon receipt from storekeepers.

(j) The master stock book is to be used in the general storekeeper's office to check quantities ordered by storekeepers, to distribute surplus material between stores and to locate and distribute material needed in emergency cases.

(k) The record in the master stock book is temporary and for use in the current month only. The permanent record is the stock book RSA-21 at the storehouse.

(l) Additions and corrections on key sheets should be made by bulletins issued by the general storekeeper and the changes made simultaneously in all stock books at the storehouses and in the master stock book in the general storekeeper's office. When new key sheets are issued, in order to safeguard the uniformity of the stock books, the general storekeeper will require that the obsolete key sheets be returned to him with the storekeeper's acknowledgment of receipt of new key sheets.

The report is signed by J. G. Stuart (Chairman), C. B. & Q.; J. W. Gerber, Southern; W. C. Weldon, C. & S., and F. D. Reed (Ex-Officio), C. R. I. & P.

Discussion

J. G. Stuart (C. B. & Q.): I might say in presenting this report that we decided we would get the best help by appealing to the different roads, and others we thought might be particularly interested in this work, and particularly have the knowledge of it. We also took this up with each supervisor of stores under the Federal Administration, also every past-president of the Railway Storekeepers' Association, and quite a number of other men prominent in store department work. We received answers, I believe, from practically every road that we wrote to, and every individual—something over 40 replies coming in. In general, everyone seemed satisfied that the principles as put forth in the book of rules, which was adopted by the Railway Storekeepers' Association, was satisfactory, and very few changes were suggested. The committee, however, felt that we should keep abreast of the times and, after going into the matter quite extensively, decided that we would present to the association the idea of the master stock book and ask that it be substituted in our book of rules for the stock book which was originally adopted in the book of rules in 1914, and then revise and change the book used under the Federal Administration and issue the new Federal Administration Book of rules, so we come to you to-day recommending that this association adopt a book of rules as originally adopted by the Railway Storekeepers Association, and next, that the master stock book idea be incorporated in Part II, in place of the stock book that is described there.

The Chairman: We are here for the purpose of determining and recommending the best practices as a whole. We realize that we cannot lay down a set of rules that is going to fit every condition, but we can lay down practices which have been found, by practical application, to meet generally all conditions, and the book of rules is that basis. Everyone is expected to ask the committee any questions, make any suggestions or changes which they think will improve these rules, so that the general committee, and the section itself, may get the best there is.

J. E. Mahaney (S. A. L.): I believe that the general stock book should be in the hands of every general storekeeper. I do not think it is necessary to have a general stock book or any part of it in the hands of a local storekeeper, such as at roundhouse points, or other points, because our traveling store inspectors and storekeepers should be in close enough touch with the materials they have on hand, so that they

would not require it. I am in favor of the general stock book.

W. B. Hall (D. & R. G.): Last January we put into effect the master stock book for the first time, and I would not be without it. It opened my eyes as well as the manager's. We had some opposition to the scheme in the first place, but I am satisfied our people are in accord with it and we expect to carry it. We do not aim to have a master stock book at the small stores, such as Mr. Stewart mentioned, at roundhouses; but at our main stores, where we have stock, we are getting our monthly stubs for our master stock book.

F. A. Murphy (B. & O.): We have recently adopted the master stock book on the Baltimore & Ohio, and we believe it is going to be all right. It has been given a good trial and we are encountering a good deal of difficulty in getting it started. It may not be advisable to work it at the smaller outside points; but we believe it will work out all right in the main storehouses along the line. We have encountered considerable trouble in putting it in on certain divisions, due to the fact that so much power is switched on our railroad. But after the books have been in use for a while we feel it will be very good.

W. A. Hopkins (M. P.): The Missouri Pacific has used the master stock book for about 10 years, and we handle the stock book a little different from the way the committee suggested. We go as far as they have by what we term a temporary manner. We take our regular stock book and bring in the coupons, and do all the transferring of material, and make all the temporary records in this field book, and then transfer that into the permanent record, and this stock book is called the master stock book. There is one item to a page, and that page runs for two years. We transfer all receipts of material and everything into that item. I have samples of these sheets here, if any gentlemen are interested, and will show and explain them in detail. We feel the stock book, as far as stores is concerned, is all right, unless a general storekeeper has a record of his own.

G. G. Yeomans (N. Y., N. H. & H.): I would like to ask Mr. Stuart one question. Isn't it desirable, that there should be a uniform arrangement of material in the storehouses, and if so, is this any help in handling the material. Isn't the stock book one of the means of practically forcing a uniform arrangement of material for the man in charge. If the man in charge runs up against the difficulty spoken of, does he not see, that his material is arranged in such a way, as to be entered most easily in the stock book, and wouldn't that bring about of itself a uniform arrangement of the material.

J. G. Stuart: That is one of the ideas of the master stock book, by having it in every storehouse, almost of necessity, the man has got to get his stock in exactly the order, so that you will find at every storehouse the thing exactly in the same order.

O. C. Wakefield (N. P.): We have had a master stock book for about 15 years. We have kept in our general storekeeper's office stocks that remained at the divisional quarters. We could not get along without it. I do not see anything the matter with the stock book which the committee has recommended that cannot be followed with the regular stock-books which have been adopted.

It was moved that the report of the committee be approved and adopted. This motion was seconded and carried.

Report of Committee on Material Accounting

IT IS THE UNANIMOUS recommendation of this committee that the following report be considered as a basis of standard practice for the accounting for material on all railroads:

General Plan

The committee assumes that there is no longer any question as to the necessity on all roads for an organization whose function embraces the ordering, receipt, custody, issue, and accounting for all materials required in construction, operation, and maintenance. In addition to the movements required in the ordering and physical handling of such materials, it is manifestly within the province of the stores department to also

supervise and direct the accounting for material as it affects its distribution.

The committee, therefore, recommends that on all railroads all accounting, not only for the ordering and receipt of material, but also for the final issue and distribution, be done in the stores department and under the supervision and direction of the head of this department, subject to proper checks by the accounting department. It is the opinion of the committee that this accounting should include all movements covering miscellaneous material, rails, ties, fuel, stationery, and commissaries.

The committee recommends that an organization for this purpose, under the supervision of the stores department, should

have as its active head a store accountant, reporting to the general storekeeper, and under whom the necessary force to fully cover the situation would be maintained.

It is the recommendation of the committee that as far as possible the store accountant be placed in immediate direction of all accounting for rails and ties. In fact, all movements in the accounts affecting the final charges to operation or capital accounts should be centralized in this department. The reports submitted in previous years have been very complete and cover very fully the details and fundamentals required in connection with the accounting for material in all its phases.

The committee referred to the report of the Accounting Committee as submitted at the meeting of the Storekeepers' Association in January, 1919,* and, being in entire accord with these recommendations, submitted it as part of the report.

The committee recommended that the vouchering of invoices should be handled in the office of the purchasing agent on invoices duly attested as to quantity of material and date of receipt by the stores department.

Fuel

The committee recommended in connection with accounting for fuel that a special committee be appointed to consider more fully and report at a later meeting as to the details in connection with this accounting. The committee found such a variety of methods that it was not practical to reduce them to any concise form that would be considered standard methods. The committee recommends as to fuel accounting in general that it should be handled by the stores department as far as the handling of the detail accounting in connection with the receipt and final disbursement is concerned. The committee also recommends that all fuel records of a statistical nature should be centralized in the stores department, though it has not been found possible to submit what might be called a standard method, but as fuel accounting was not touched upon in detail heretofore, submits as a basis for consideration the following plan of accounting:

Accounting for Purchases.—A daily report of fuel forwarded should be rendered by agents or fuel foremen at stations from which fuel is originally shipped or at which it is received on the line. The original should be sent to the general purchasing agent and the duplicate to the general storekeeper. The purchasing agent should originate triplicate invoices and vouchers as a basis of charge to the accounts, the original voucher and invoices supporting them to finally reach the auditing office with the attesting signature of the storekeeper, acknowledging receipt, which information he secures from the daily reports above mentioned.

Consignments of fuel shown on daily reports should be verified in the storekeeper's office against purchasing department invoices, as to weights, and in case of fuel oil, as to gallonage, temperature, and m. & b. s. deduction. At the end of each month the storekeeper should recapitulate the total tonnage or gallonage as verification against shippers' invoices.

Accounting for Receipts and Issues at Stations.—Fuel service tickets should be obtained from engineers by fuel foremen or agents for the fuel furnished. A convenient form is made in triplicate showing the quantity of fuel furnished to each engine. The original of these forms should be furnished to the engineer for his immediate information, and the duplicate sent to the storekeeper as supporting papers to the daily form for reporting fuel issued.

Fuel foremen or agents should render daily forms in duplicate to cover fuel received, issued, and forwarded to other stations, sending the original to the storekeeper and holding a carbon for record.

Fuel foremen or agents should render a daily report of fuel unloaded, in duplicate and send the original to the storekeeper, retaining a carbon.

Fuel inventories, showing actual quantities of fuel on hand at the close of each month, should be rendered by fuel foremen or agents and sent to the storekeeper on the first day of the following month.

Receipts and issues of fuel for miscellaneous purposes (other than for use of locomotives) should be accounted for in similar manner to locomotive fuel, except that the report made will be rendered to the storekeeper weekly. This would include coal

used at stations, interlocking plants, roundhouses, etc. Daily reports of coal received on the line and handled by the storekeeper is issued or received.

A list of cars not accounted for by the receiving station, representing cars in transit, should be drawn from the original reports of coal received on the line and handled by the storekeeper until final accounting for each individual car has been made. This would constitute a continuous "In transit" list, which should be maintained by eliminating all shipments which have been accounted for, and adding all unreported current month's shipments. This "In transit" list should be compared with cars shown on the monthly inventory and all cars should be kept down to the minimum.

The storekeeper should furnish the audit office, as soon after the end of the month as possible, a balance sheet of fuel transactions, showing thereon issues by stations to locomotives in each class of service, issues to other accounts benefited, and quantities sold, the sales being supported by a list of bills rendered.

The total receipts should include chute droppings and sump oil.

The grand total of receipts covering purchases should be balanced with the current month's purchases by adding to that allocated to stations the quantity shown "In transit from mines" and deducting that shown as "Received not vouchered."

The balance on hand at the close of each month as per inventory should be entered on the record and the book balance adjusted to agree therewith.

Fuel Distribution.—A proper form should be used for condensing daily issues by accounts, and by individual engines, respectively, so that the storekeeper can furnish the audit office, as soon after the end of the month as possible, separate reports as follows:

(a) Distribution of locomotive fuel, showing quantities and value chargeable to each account, by divisions, main and branch line districts and freight and passenger service, and states.

(b) Quantities of fuel issued for switch service.

(c) Separate distribution of quantities and cost in total, by accounts, of miscellaneous fuel issued.

(d) A consolidated distribution by accounts of both locomotive and miscellaneous fuel.

Issue Price of Fuel.—The issue price of locomotive fuel should be determined each month by the storekeeper about as follows:

(a) The purchase price for fuel, plus handling for the current month, should first be arrived at by using the current purchases to date as reflected by invoices with an estimated amount added for handling.

(b) A rate per ton for coal, or per barrel for oil, sufficient to absorb the overage or shortage in the stock account resulting from the use of the estimated average issue price for the previous month, should be added to or deducted from the purchase price determined as outlined in (a). This rate per ton, or per barrel, should be the difference between the actual stock price of fuel on hand at the close of the previous month and what it should have been on the basis of an estimated inventory of fuel on hand and cost thereof. The issue price of miscellaneous fuel should be based on the actual invoice price.

Fuel for Firing Up Locomotives.—The value of wood purchased for firing up locomotives should be charged direct to the fuel account. The cost of gathering old ties and other scrap wood for the same purpose should be charged monthly to the same account by a memorandum bill prepared by the storekeeper, supported by statements furnished by the superintendents.

Statistical reports showing the pounds of fuel per thousand ton miles, in various classes of service, should be prepared in the storekeeper's office along lines best suited for the individual requirements of the road, and it is not thought practical to outline any standard method of forms for any of the above movements at this time.

The committee calls attention to the fact that while previous reports from accounting committee show a very great amount of careful study of the question and embody many very valuable suggestions, yet it appears that there has not been any effort made to standardize practices on various roads commensurate with the importance of such procedure. The committee therefore recommends that if this report is adopted as a sense of the section, some definite plan be worked out whereby the recommendation of this section be submitted to the various rail-

* See *Railway Age*, January 31, 1919, page 287.

roads in such a way that the store departments interested will receive the assistance and authority from their management that will enable them to proceed along the lines recommended by the section.

The report is signed by W. E. Brady (Chairman), A. T. & S. F.; G. A. Secor, C. & A., and H. E. Ray (Ex-Officio), A. T. & S. F.

Discussion

The Chairman: This is a very important subject. I judge there will be a great deal of criticism, because it was hard to get up any report on accounting that would suit various conditions.

G. A. Secor (C. & A.): It has been the understanding for years that the stores department should account for all material as it is issued. We feel that the stores department can handle the accounting of material under the supervision of the auditing department, as accurately and cheaply as any other department. We do not think that the stores department should order the material, pay for it, and charge it out on departmental invoices as is the practice on a great many railroads where the department will charge out the material to the primary accounts. We believe that in our organization we have accountants capable of working and following out the accounting features entirely. The stores department charges to the department which has ordered the material the value of the material. This department in turn charges to the primary accounts the value of the material as it is used. Why cannot the stores department charge this material directly to the primary account as it is ordered by the using department?

This system can be followed by having the using department charge material by indicating on the requisition the account number or A. F. E. number on which the material is going to be used. This avoids duplicate handling of material. We report directly to the auditor and receive the auditor's instructions, and in that way I think that the stores department is not only a material department but an accounting department as well.

H. E. Ray (A. T. & S. F.): The great trouble with the departmental charge is that the minute the stores department charges it out to some other department they lose control of the material. The discussion has taken a turn that I did not anticipate. I thought from the last several meetings of this association that there was no longer any question but what the stores department was the proper place for the final charge to the primary account. I did not anticipate that there would be any comments along that line. The stores department is the place for all the material business accounting. It is simply one movement of the general plan. It has worked so well on the roads that do that sort of thing, that I hope the association will not consider seriously the question of diverting the accounts from the stores department.

G. G. Yeomans (N. Y., N. H. & H.): I had thought that the question of the propriety of the store department accounting for the material up to the primary accounts was so thoroughly established that it could not be questioned. Of course, it is the idea that no material will be drawn by requisition until it has to be used. The minute that you stop that practice, and simply charge the department, you open the door at once for these departments to make requisitions ad libitum, for any amount of material that they desire without being obliged to make a definite charge.

You immediately begin an open door to building up duplicate stocks in the hands of all departments over which the store department has no control whatever, because the minute a traveling storekeeper goes out on the line and sees a lot of material lying there, which has been there for months, he orders that material sent into the storehouse. He is immediately met with the objection, that is my material, not yours. That is charged out. That is charged to me and belongs to me, and he has lost control of that material.

When I first became connected with the New Haven, the divisional accounting methods were in effect. The different division engineers, maintenance and mechanical men made their charges to the accounts that simply made requisition on the stores. I took the question up with the comptroller with a view to getting it changed. He would not consider a change. He said the only possible correct way of accounting for material was to have the man that was using the material charge it out and refer the charge to him, because he was the only man

that knew what it was going to be used for and when it was used. To-day the comptroller of the New Haven would not have anybody fool with the material accounts except the storekeeper and the stores accountant.

There are so many things that could be said on that subject that it is almost impossible to know when to stop, and I am going to stop right now. But I do hope that this committee will never let go of that one vital feature of proper storekeeping on the American railroads, and that is that the stores department must have the entire charge and control of accounting for material from the time it is received on the railroad until it is actually put in use.

F. D. Reed (C. R. I. & P.): This subject has been hashed over in the convention of the railway storekeepers for the last fifteen years to my personal knowledge, and as the saying is, every fence has two sides. I believe that all storekeepers will concede that the accounting for materials and primary accounts can be more economically done by the store department than it can be by the maintenance of roadway or the operating department. The storekeeper when he makes a charge on a requisition or an order properly approved and designating an account to the roadway engineer or mechanical department accounts, with a little more effort could charge that to freight car repairs, locomotive repairs, construction betterments, or any other account that might be benefited or involved, just the same as he could by transferring that with one accountant to the mechanical department, roadway or some other department, who have to have another accountant to boil that down and get it in shape to put it up to the department of disbursements. I believe it is to the interest of the railroad companies that the material accounting for primary accounts should be done in the storekeepers office and a great deal more economically than it could be done by transferring it to the various departments.

Mr. Hall: We must not look at this narrowly as merely a store department proposition. We have got to look at it as the road as a whole. Now, while the machinery is all set up and the train in operation, rather than to stop the train and turn that invoice over to somebody else to take it up again, and the engine start in again, it is better to keep going right straight through and finish it.

The meeting then adjourned to Tuesday, at 9.30.

A motion that the report be accepted and adopted by the Accounting Committee as far as the accounting for material is concerned, and a recommendation to investigate further on fuel was seconded and adopted.

Lost and Found

LOST BADGES

- | | |
|----------|---|
| No. 5604 | J. T. Miller, Standard Car Truck Co. |
| No. 5629 | E. A. Emery, Gustin-Bacon Manufacturing Co. |
| No. 5933 | H. E. Creer, The Camel Company. |
| No. 5334 | A. L. Schuh, Independent Pneumatic Tool Co. |
| No. 8093 | Mrs. A. R. Jarvis, care of <i>Railway Age</i> . |
| No. 6893 | S. T. Hopkins, Safety Car Heating & Lighting Co. |
| No. 5749 | Geo. W. Lyndon, Association of Mfrs. of Chilled Car Wheels. |
| No. 5298 | G. T. Aitken, Frontier Chuck & Tool Co. |
| No. 5813 | J. Will Johnson, The Pyle National Co. |
| No. 6369 | W. H. Moore, Metal & Thermit Corp. |
| No. 6083 | H. J. Tierney, Grip Nut Co. |
| No. 5759 | E. W. Kavanagh, Joseph T. Ryerson & Son. |
| No. 6770 | Geo. A. Rogers, Lowe Brothers Co. |

FOUND

One return railroad pass or ticket. Apply Blue Rose Tea Room, 2505 Boardwalk.

Leather memorandum book. Apply to Secretary Conway, Million Dollar Pier.

An Evening of Surprises

THE CONVENTION week program told us that there would be special features during the dances last night. There were. During the intermission the audience was delightfully entertained by the little Atlantic City girl dancers who entertained us last Wednesday night. Under the direction of their teachers, Joseph Dawson and his daughter, they gave seven dance numbers, all of which were heartily applauded. Then the surprise came. George R. Carr, president of the Railway Supply Manufacturers' Association, was called to the middle of the ball room and was presented, for his extremely able services in behalf of the Association, with what was apparently a large box of American Beauty roses. Mr. Carr showed his great surprise at the gift, but gracefully thanked the audience and was about to carry the gift away when one side of the box suddenly opened and out stepped a little four-year-old Atlantic City maiden, beautifully dressed as a ballet dancer, who proceeded to dance to the great amusement of all. She was one of Miss Dawson's pupils. The entire "act" was staged in secret and was greatly enjoyed by all.

Those of the Entertainment Committee who were in Charge of last evening's entertainment were: S. W. Sargent, chairman; Oscar C. Hayward, R. J. Himmelright, Langley M. Graham, I. C. Rogers, L. B. Sherman, Gardner Taylor and W. B. Wise.

Section III Elects Officers

THE RESULT of the balloting for officers of Section III, Mechanical, was announced during yesterday's session. The balloting was confined to vice-chairman and members of the General Committee.

J. Coleman, superintendent car department of the Grand Trunk, was unanimously elected vice-chairman, and the following were elected members of the General Committee:

F. W. Brazier, N. Y. C.; H. T. Bentley, C. & N. W.; J. J. Hennessey, C. M. & St. P.; C. E. Chambers, C. R. R. of N. J., and Wm. Schlafge, Erie.

Following the announcement of the election, F. W. Brazier presented the following resolution:

"Resolved, That the officers of Mechanical Section III of the American Railroad Association should be elected annually instead of every two years, in order that a greater number of members may enjoy the honor of being officers of the Section."

This resolution was unanimously carried.

Chile in Market for Locomotives

THE NEW YORK TIMES states that the Chilean Government is in the market for \$8,000,000 worth of railway rolling stock. The railways in Chile are government owned and during the war but few improvements were made; now it is necessary that something be done to meet the growing commerce of that country.

A series of articles on the principles of car lighting by electricity will be published in the *Railway Electrical Engineer* beginning with the July issue. These articles are being prepared by Charles W. T. Stuart, chief electrician, car lighting department, Pennsylvania Railroad. Mr. Stuart is spending a few days of his vacation at the conventions in company with Mrs. Stuart and Miss Marjorie.

The Man Who Saw

Use Your Brakes—Not Your Whistle

The worm turned with a start when the raucous horn of a flivver rattled close to his left ear as he crossed the street. He worked in the general offices of the High Dry & Windy R. R., and was so busy wondering how he could get all the other worms to subscribe to his petition for a six-hour day and no Saturdays, that he did not notice the hurried approach of the Machinist's Helper in his brand new car.

As he landed safely on the curb he shook his fist at the departing magnate with an oath and an admonition to the effect that "if he was half as apt with his brakes as he was with horn the undertakers in his community would lose their hopeful looks."

He was reminded of the Air Brake Man's clever advertisement in his railroad paper. It said, "The real measure of a train's safety is its ability to stop."

Jazz Time Thinkers

"Tell me," said the English railway gentleman visiting an American railroad convention for the first time, as he nervously twisted the head of his cane, "I say, how can you Americans really manage to think and work around here with this noise—the music and all that hubbub, don't you know? It would drive me mad. Really, I shouldn't be able to concentrate at all, you see. At home, you know," he continued, "we have our machinery expositions and all that, but we don't make such a bally big fuss about it. Our parties and balls—our social activities are jolly well separate affairs, I assure you."

"Well," said the Man, as he unconsciously remembered the psychological differences in the temperaments of the two great races, "the American in convention is a jazz-bo—a natural rag-timer—a high stepper. He mixes business here with music, laughter and handshakes just as he used to mix his cocktails—and he thrives on the mixture."

"I don't quite 'get you,'" commented the Briton on this illuminating answer, using an expression he had picked up on the boat, "but your accomplishments are, I should say, 'rawther extraordinary,' in spite of it."

"Thanks," said the Man, "that's what really buys baby's shoes after all, isn't it?" The Briton nodded a puzzled head as he turned to go and he thought to himself, "Queer chaps these Yankees, eh what?"

The College Man Makes a Call

The "old man" put on his second pair of specs and squinted at the name on the card. "Well, well, if it ain't 'Smithy.' You remember him," said he, addressing the chief clerk, "the young graduate of Boston Tech we had here last year?"

"Oh, yes," said the clerk hurrying to agree with his boss as usual, "he put on brake shoes in the night round-house, didn't he?"

"Yep," said the S. M. P., "that's the feller—let him in."

The clean, good-looking Smith that entered and saluted his former employer had the same old snap in his eye that the old man remembered in the greasy youth who struggled with the brake shoe; but the man had grown. The year seemed to have added ten to his experience.

"How are you getting along Smith?" inquired the "old man" as soon as they were seated.

"Fine—fine. I'm now an officer in our company."

It was with difficulty that the S. M. P. was able to concentrate on his former subordinate's compelling sales talk as he inwardly regretted his loss in the promising boy.

"Why didn't I raise him? I might as well have; he's getting twice as much now—and, by jingo, I'm paying for it," thought he, as he made a mental picture of the array of new tools on the order he had been saving for him.

Help Wanted—Male

The Mechanical Engineer and the Supply Man were checking up the details of the 100 new Mikados.

"Seems to me," said the Mechanical Engineer, "that this dimension is wrong. If we built these engines according to this drawing the frame would be too long by about 8 inches. I'll call in the man who perpetrated it."

In response to the buzzer, the culprit appeared. To the Man Who Saw, he appeared as mentally short as his disheveled hair was long. His explanation of the error was punctuated by his scratching his head with his pen. It seemed evident that he was unaware of the trouble as he withdrew with the blue print in embarrassment.

"How much do you pay that jewel?" inquired the Supply Man.

"\$50 a week," answered the Mechanical Engineer.

The Return of Mr. Dinger

Mr. Hum B. Dinger, who arrived in the night in order to be here in time to take up his "work" among the car builders, called for his mail this morning with a motor truck, much to the relief of the crowded editor. The Man, pleased at his re-appearance, regrets having been unable to extract much information from this interesting figure whose interviews in Washington evidently foreshadow events of momentous importance.

The only response to the eager interviewer's rapid-fire questions brought the hurried reply, "Too busy to talk—nothing to say—except that you spilled the beans by publishing that telegram from Jim Skeevers advertising my middle name as 'Bug.' I don't mind fair criticism of my activities —"

"But," interrupted the Man anxiously, "your middle name is Bug, isn't it?"

"What of it?" replied Hum, trying to sidestep the admission.

"Well, it seems to me, you'd change it if you really have hopes for the ultimate success of the Prune Plan—the name Hum Bug is invariably associated with Bunko games, you know."

"Forget it," ejaculated Hum, shifting his heavy bundle of mail to the other arm, "every knock is a boost. I'll turn the railroads of this country over to the supply man yet—watch me!"

And as the celebrated Mr. Hum Bug Dinger tore out of the booth, the Man wondered, "He might be a national figure yet," thought the Man to himself, as he resumed his grind of grist for the editor's mill.

The convention is entertaining another visitor from the land of the crysanthemum, in the person of T. Nagata, of the Nippon Locomotive & Car Manufacturing Company, Osaka, Japan.

Lone Star Entertains

The railroad man from Texas was seated in a booth surrounded by the old friends of his supply trade youth. "Tell us a story, Jimmie," said his old college mate, the S. M. P. from Detroit. As Jimmie related the following tales, the Man hoped that they would produce a snicker from those who so far have not had the time to smile.

"Three negroes sat on a baggage truck at a country station. Sam was 'showing off,' as he called the names of the railroads indicated by the initials on the box cars of a slowly passing freight. S. P., M. K. & T., C. & O. and others were all correctly explained to the enlightenment of his less able friends when along came the sticker—C. B. & Q. 'What's dat railroad, Sam?' inquired one of the dusky ones. 'Chicago, Beaumont & Cuba,' replied Sam, with confidence."

* * * *

"It was back in the days of the struggle for a standard contour for M. C. B. knuckles when the coupler manufacturer decided to send Heeser Mixer out on the road. Not that Heeser was much of a technical man, but a good mixer, as his name implied; he invariably got into the "inner office"—and that's what really counted after all, thought the manufacturer.

"Heeser was on the 'inside' in his first call and had just finished up a fine coupler speech for the edification of the S. M. P., who listened attentively as he inspected the model.

"'But you haven't got the contour,' ventured the old man.

"Well, what do you know about that?" answered the unabashed Heeser, "that doggone shipping clerk forgot to put it in—I'll wire him for it right away—I can get it here to-morrow!"

* * * *

"The general manager had decided that the best way to settle the new mail crane question was to call a meeting of all concerned, which was duly done.

"At the meeting sat the salesman whose crane was under serious consideration for adoption, a bright new shiny model of which reposed before him. All the arguments were in and it looked pretty much like a whale of an order, when from the back row rose a serious-looking individual, who threw the following monkey wrench into the machinery:

"'Gentleman,' said the inconsiderate one, clearing his throat for the assault, "you've all noticed that this crane is mounted on a platform and you have to climb to get to it.' Silence and a closer examination of the model carried conviction to the salesman as he squirmed a little, wondering what the goof was going to spring.

"'Now you probably know, gentlemen,' continued the crepe-hanger, evading the glare of the salesman, 'that we have a great many one-legged station agents on our line who are handicapped with wooden stumps. Imagine them climbing up on this platform with the mail bag—why, it's a joke!"

"Thus relieved of his burden, the informer sat down, as the salesman rose to his feet, quick in the emergency that threatened his prospects. 'Gentlemen—just a minute. In consideration of this man's testimony, I'll make you the following proposition:

"'Give me all the two-legged stations and I'll concede the one-legged ones to my competitors!"

European Railway Observations

By Robert E. Thayer

European Editor, Railway Age

Foreign Three-Cylinder Locomotives

The railways of Europe are given to a very extended use of the crank axle with either three or four cylinders, but now that the cost of labor and materials has increased and difficulties are experienced in having the work done properly, the railways are questioning the desirability of the continuation of this type of locomotive.

In England the railways are rather forced to use three or four cylinders in order to obtain the required amount of power. The reason for this is that the clearance limitations are too small for enough power to be obtained with two cylinders outside the frame. The English roads have, of course, had a great deal of experience with the crank axle, but the cost of making these axles has increased to such an extent that they would be glad of an opportunity to rid themselves of it. Before the war the cost of manufacturing a crank axle varied between \$600 and \$650, whereas now the cost is between \$1,650 and \$2,500.

In France, where the clearance limitations are not as restricted, there is a very decided tendency to eliminate all crank axles. The standard locomotives which are being designed by a committee of French railway engineers are of the two-cylinder type. The same thing applies to the railways in Germany. It is the tendency in both of those countries now to give up the construction of any more inside cylinder engines and particularly the compound engine. With superheaters so well developed and, in Germany, with the successful use of the feed water heater, it is claimed that there is not sufficient advantage in compounding to warrant the construction of such a complicated design.

Railway Conditions in Italy

The Italian railways, like almost all other railways in Europe, have suffered greatly from the restlessness of labor and in particular from the shortage of coal. Coal at the present time costs \$35 a ton at the prevailing rate of exchange, but at the normal rate of exchange it would have a representative value of \$70 a ton. Travelers returning from that country, particularly last winter, speak of real hardships in traveling. There was no heat in the passenger trains, the cars were not lighted enough at night to permit one to read (storage batteries are used very generally throughout the country for car lighting), there were very few sleeping and dining cars, and as a result the sleeping space was at a premium. Both freight and passenger service were greatly curtailed and passenger trains were loaded to the limit.

The design of the Italian equipment indicates some very good engineering ability. Passenger engines are particularly well proportioned, but, of course, are light compared with the locomotives of the United States. A number of four-cylinder locomotives are used and operated economically. Throughout Italy the locomotives are coaled by hand.

Efficiency of the shop men has materially decreased, due to the general attitude of labor throughout Europe. The mechanics in the shops, however, are a high grade of men and must pass a rigid examination before they are admitted to the shops.

All of the rolling stock is provided with the screw type coupling, and all except the freight equipment is provided with brakes. The passenger cars use the clasp brake and the Westinghouse equipment.

Bad Order Cars in England

Frequent questions have been asked regarding the bad order car situation in England and the condition of the "rip tracks." The situation in this respect is interesting. It is impossible for one to find a "rip track" in England similar to those which are found in the United States. The English railroads, despite the large amount of rain for which England is noted, have but few house cars. Most of the cars are of the open top type and the freight is protected by means of tarpaulins which are spread over the car and securely tied to the sills. The cars themselves are of light capacity, carrying on an average slightly over 10 tons. The construction is exceedingly simple—there are no brakes to take care of, the couplers consist simply of a three-link chain attached to draw hooks, and the buffers are generally of a simple spring type placed at the ends of the side sills. Some of the older cars are not provided with any spring buffers, and in this case the side sills are extended beyond the end of the car to take the shocks. The cars are almost entirely of wood, there being but comparatively few with steel underframes. But very few of the cars are provided with automatic brakes. With this simple construction the difficulties of maintenance are not great. England's car situation is complicated somewhat by the fact that about half of the freight cars are owned by private companies, which require the cars to be returned empty to their originating point; but with a country as small as England, this does not make a very difficult problem.

Steel Versus Copper Fireboxes

An interesting article was published recently in the *Revue Generale des Chemin de Fer*, written by Paul Conte, assistant to the chief engineer of the Central Office of the Railways in France for the study of railway equipment. Mr. Conte described comparative service tests that had been made with copper and steel fireboxes, many of which were handled on the Paris-Orleans. His conclusions are extremely interesting and indicate a strong desire of the European roads to adopt steel fireboxes. He says that, "We are convinced that by using special precautions, steel or composite fireboxes can be substituted for copper ones." It has not been found that the difference in life between the two types of fireboxes is sufficiently great to warrant the use of the more expensive copper boxes; but the difficulty has been that the European roads have not had sufficient experience with steel fireboxes to know how to handle them properly. Mr. Conte suggests to those roads which are planning to substitute the steel firebox for the copper to begin by making it a general custom to wash and fill the boilers with hot water in order that this will be the general practice before the steel fireboxes are put into service. He believes that the failure to do this has been the greatest source of difficulty.

The European roads still adhere to the copper construction in their locomotives. On one important English road it was found that the amount of copper used in one locomotive amounted to something over 10,000 lb., which with copper castings at \$45 per hundred pounds and ingot copper at \$40 per hundred pounds, involves an investment of some \$4,500 in a locomotive for copper alone. Some of the roads make their driving boxes entirely of bronze and in addition to the copper firebox sheets and staybolts use a copper dry pipe. It is thus apparent that if steel could be used in place of copper a large saving in carrying charges could be made.

Conventionalities

J. J. Edwards, secretary and treasurer of The O. M. Edwards Company, Syracuse, N. Y., is attending the convention for the first time in eleven years. He is stopping at the Marlborough-Blenheim with Mrs. J. J. Edwards.

Dr. W. F. M. Goss, president of the Railway Car Manufacturers' Association, has arrived to attend the convention. Doctor Goss used to come to the conventions as dean of the College of Engineering of the University of Illinois.

The many friends of Mrs. Charles D. Jenks will regret to learn that Mrs. Jenks is quite ill and under the doctor's care in her room at the Marlborough-Blenheim. It is hoped that her illness will not prove serious, although she has been suffering very greatly.

Several friends of B. E. D. Stafford, of the Flannery Bolt Company, visited him at his country place, Millville, N. J., on Sunday. He is slowly but steadily recuperating from his illness. Strawberries are just ripening and he sent the *Daily* a box of choice ones from his patch.

George W. Denyven, the newly elected member of the executive committee of the R. S. M. A., representing the first district, should be classified as representing George W. Denyven, rather than as shown in the report of the election published in Monday morning's *Daily*.

Robert Carr, president of the Dearborn Chemical Company, will have to miss the convention again this year. He is a member of the board of trustees of the University of Illinois and his presence is required at that institution in connection with the commencement exercises.

It is greatly to be regretted that convention attendants generally paid so little attention to the fact that yesterday—Monday—was Flag Day. It was good to see R. D. Smith wearing a flag in his lapel and appealing to the patriotism of his fellows. We have appointed him a committee of one to see that the *Daily* gives conventioners advance notice next year.

Lawford H. Fry of the Standard Steel Works is at the convention this year with W. A. Charles Thorpe of the Indian State Railways and A. H. Bone of Rendel, Palmer & Tritton, London, as guests. Mr. Thorpe is investigating the development the use of powdered fuel in this country, and Mr. Bone has charge of the inspection of the locomotives being built for the Egyptian State Railways.

The discussion on autogenous welding Monday brought out the need for the scientific analysis and control of welding processes. O. H. Eschholz, research engineer of the Westinghouse Electric & Manufacturing Company, has prepared a bulletin on this subject. It discusses the fusion phenomena occurring in electric welding and suggests a practical training course for operators as well as methods by which their proficiency can be gaged.

Favorable news has been received at the conventions regarding the cases of H. R. Warnock, general superintendent of motive power, and J. J. Hennessy, assistant master car builder of the Chicago, Milwaukee & St.

Paul, both of whom have been ill. The news is that Mr. Hennessy after having had an operation has recovered sufficiently to be sitting up in a wheel chair in the hospital, and that Mr. Warnock has become well enough to be moved to his former home in Maryland.

J. E. McQuillen, mechanical superintendent of the Gulf, Colorado & Santa Fe, who is attending the convention, told something the other day which indicates one of the principal reasons why the Santa Fe System has been so successfully managed. At a recent meeting of the officers of the G. C. & S. F. it was found that there were only two men present who had been with the road less than 20 years, these two being the vice-president and general manager, and Mr. McQuillen, and both of them had been with the property 18 years.

R. L. McIntosh, of the Pyle-National Company, who has recently made an extended visit to Europe, has returned to the United States and is at the conventions with many interesting stories to tell of his experiences. He was much impressed with the engineering abilities of the foreign railways, particularly of the Italian roads. He says the Italian locomotives are very well designed and present an artistic appearance. The largest freight engine in Italy is of the 0-10-0 type, while there are a number of Prairie and Pacific type engines in use in passenger service. The passenger engines have high wheels and operate at high speeds.

Col. M. C. Kennedy, vice-president, Pennsylvania Railroad, registered with his son, M. C. Kennedy, Jr., on Monday morning. Col. Kennedy was formerly president of the Cumberland Valley and under the new organization of the Pennsylvania, was appointed vice-president in charge of real estate, purchases and insurance. During the war he was a deputy director-general of the Transportation Corps of the American Expeditionary Force, with office in London. Col. Kennedy is one of the most widely-known men personally in the railroad business. In each October he gives a luncheon to his railroad and other friends at his country home, Ragged Edge, near Cumberland, Pa., and this annual function has now grown so large that three or four special trains to Cumberland are run from different points, and the party always includes many of the leading railroad officers of the country.

When it comes to golf the convention visitors could organize a team which probably could compete successfully against any team that could be organized by any convention in this country. D. E. Sawyer, of the Pollok Steel Company, who has been one of the regular visitors at the conventions for a good many years, arrived yesterday, accompanied by Mrs. Sawyer and covered with the glory won by him last week in capturing the golf championship of the metropolitan district of New York. "Ned's" score in the first round of the tournament was a sparkling 71. Another of our first-class golfers is Clayton Ingraham of the American Waste Company, who is here attending the convention, accompanied by Mrs. Ingraham, and who went around the Sea View course Sunday morning in 76. Another of our extraordinary convention golf players is Charles T. Ripley of the Santa Fe, who also is here. Mr. Ripley became a crack golfer in his college days. Within recent years he has not been able to play much and during the last year has hardly played at all. Golf is always supposed to be a game which, if a man is to play it well, requires constant practice and playing, but after having played only two games before this year, Charlie Ripley went out recently and shot an 82. There is much curiosity among Mr. Ripley's

friends as to just how good a game he would play if he played as much as most of the leading golfers. He broke the record of the Chatham course in Massachusetts some years ago by shooting a 67.

Among the convention visitors on Sunday and Monday was C. W. Galloway, vice-president in charge of operation of the Baltimore & Ohio.

R. S. Mounce, general car foreman of the Erie at Jersey City, who registered Sunday, has been seen on the Boardwalk wearing an expansive smile.

In going over last year's *Daily* we find that Karl J. Eklund, of Mudge & Co. was attending the conventions as "general manager." This year he comes as vice-president. Next year?

The many friends of C. B. Young were disappointed to learn definitely that he would not attend the convention this year. Mr. Young has recently left the Inspection and Test Section of the Railroad Administration to return to the Chicago, Burlington & Quincy and is making an extended trip over the lines.

H. C. A. Carpenter, commercial secretary of the British Embassy, has spent several days at the conventions this year and has found them exceedingly interesting. The information Mr. Carpenter has obtained here has been of considerable assistance to him in his work as a commercial representative of the British government.

Some of the friends of Leslie R. Pyle, of the Locomotive Firebox Company, are lamenting the fact that the Entertainment Committee has not availed itself of the talent among the supply men. Before entering railroad service Mr. Pyle was on the stage, and as an officer of the Fuel Association his baritone solos were features of the convention.

The amiable chairman of the Enrollment Committee, Charles H. Gayetty, is a busy man these days, working both early and late. He has not even had a dip in the ocean. This is Richard's last year on the Enrollment Committee and after serving eight years his many friends would like to see on the Executive Committee the next time the Philadelphia district has a vacancy.

Three generations of the Besler family have attended the conventions this year. The first generation was represented by J. D. Besler, of the Burlington, who is a veteran among railroad veterans; the second generation was represented by W. G. Besler, president of the Central Railroad of New Jersey, and the third generation by Mr. Besler's son, George. They are a fine railroad family.

Arthur Haller, of the American Locomotive Company, is here this year in a new role. Mr. Haller, who for years has been at the head of the publicity department of that company, was assigned to the sales department last January with headquarters in Chicago. His mileage record to date consistently indicates that he is demonstrating in a practical manner what he has been writing about for years—"service."

Just before W. T. Hanna arranged for his exhibit equipment he was called upon to decide between giving the A. R. A. members a slant at his latest type stoker or complying with the urgent demands of a large railway system and shipping his one and only completed stoker for immediate installation. When you visit space 183 you'll have to admit that the Hanna locomotive stoker is "out of sight."

Those who attended the annual meeting of the Western Railway Club in Chicago on May 17 were strongly impressed with the splendid showing made by the Silvis Shops Glee Club of the Chicago, Rock Island & Pacific, which furnished the most interesting feature of the program. S. M. Mullinix, superintendent of shops at Silvis, who is a convention attendant, is justly proud of the musical talent developed by these boys from the ranks of his organization.

The reporter of the local daily paper who claimed that representatives from all climes were coming here to the Car Builders' convention, was right. The latest arrival hails from the far away land of cherryblossoms and progress in the person of W. M. Oka, a representative of the firm of railway supply dealers, Sale & Krazar, Ltd., of Tokio. Mr. Oka's six months' vacation commenced with his visit here and will carry him on a trip throughout the United States.

There is a very attractive bachelor apartment in Chicago which apparently will soon be to let. Until recently it was occupied by Haines Williams, Clark Moore and Jack Rodger. Jack broke away and got married last spring. Now comes the news that Haines Williams is married. There is reason for suspecting that Clark Moore is finding life lonesome and is considering leaving the apartment, although Clark refuses to confirm this for publication. Mr. Williams was married to Miss Caroline Willard on March 27. Mrs. Williams accompanied him to New York, but will not come down to the conventions.

Our private wire to the Casino clicks the following: "100 yard race between L. S. Kinnard, S. M. P., C. & E. I. and S. R. Brown, Galena Signal Oil Company, won by 10 yards by Mr. Kinnard. Time 9 3-5" Our instrument did not make it clear whether it was seconds, minutes or hours. Charlie Brown, of Manning, Maxwell & Moore, acted as the starter; G. S. Goodwin, mechanical engineer of the Rock Island, timed it, and A. W. Clokey, Chicago manager of the American Arch Company, refereed the race. Russell Walsh, of the Glidden Varnish Company, "spectated" and wants to know why they let the railroad man get away with it.

Maximilian N. Groten and Simon T. Gorbounoff, both mechanical engineers connected with the Russian Mission of Ways of Communications in New York City, are attending the conventions this year. Both of these gentlemen have been in the United States for a few years, but on account of the war have been unable to carry out the extended plans they had in mind when they came. Furthermore, they have been unable to return to Russia because that the government is in the hands of the Bolsheviks. Mr. Groten, however, is to return to Germany soon to visit his daughter. While he has been in this country he has investigated refrigerator cars. Before the war he had developed an interesting system of perishable freight refrigeration, consisting of an ammonia refrigerating machine placed in one car, where the brine was refrigerated and circulated by means of a pump through five cars on either side of the refrigerating car. Because of the fact that there was not a large demand for this class of equipment it did not develop to a very great extent. Mr. Groten has also interested himself while here in an automatic coupler to be used in connection with the screw couplings which are the present standard type of coupling in Europe. Both Mr. Groten and Mr. Gorbounoff are optimistic as to the future conditions in Russia and believe that it is now only a question of time when the Bolshevik regime will be overthrown.

Special Guests

- Heiser, Chas. E., Draftsman, P. & R., Chester Inn.
Heminway, T. A., D. C. F., D. & H., Princess.
Hemphill, Joseph C., Examiner Eastern R. R. Asso., Dennis.
Hendricks, L. W., Supt. Shops, N. Y. N. H. & H., Traymore.
Hengstler J. Foreman, Penn., Luella.
Henley, R. G., M. M., N. & W., Chalfonte.
Hill, S. W., Asst. A. of D. B. & O., Breakers.
Hinkel, G. C., Draftsman, B. & O., 161 S. Tennessee Ave.
Hofmann, K. E., Asst. Engr. of Test, P. R. R., Haddon Hall.
Hoffman, P. H., Jr., Ch. Clk. Pur. Agt., Penn., Blackstone.
Hoinville, Chas. H., A. To. P. A., A. T. & S. Fe., 50 Tallahassee Ave.
Holder, J. A. G. M. B. M., Seaboard, Chelsea.
Holland, H. L., Draft, B. & O., Arlington.
Hopson, Homer P., Insp. Safety Appliances, I. C. C., Blackstone.
Hull, F. A., Traveling Storekeeper N. Y. N. H. & H.
Hunt, R. M. E., Seaboard Air Line, Chelsea.
Hyland, A. T., Asst. S. S., N. Y. N. H. & H., Princess.
Jensen, J. S., Asst. Engr., N. Y. N. H. & H.
Keim, W., Elec. For., N. Y. C., Pennhurst.
Keyes, R. W., Asst. Chief Mat. Insp., N. Y. N. H. & H.
Kidd, C. M., Gen. Air Brake Insp., M. & W., Marlborough.
Kidd, W. C., Sec. & Treas., Track Supply Assn., Chelsea.
Kleber, William, Mach. Shop. For., C. R. R. of N. J., New Brady House.
Kimmitt, P. P., U. S. Army, Avondale.
Kinney, Frank J., Ch. Clk. Sta. Dept., P. & R.
Kleinhaus, F. J., Car Acc., Int. Tank Corp., Breakers.
Kliest, R. A., C. F., B. & O., Edison.
Knapp, C. S., Mech. Eng., Pullman Co., Penn.
Knesen, Franklin L., Price Clerk, W. J. & S.
Knott, F. W., M. M., S. A. L., Osborne.
Knudsen, Knud Vendelbo, Tech. Dir., Ind. Financura Argent.
Kunnett, Mrs. P. E., C. R. of N. J., Arondale.
Lance, C. C., S. Eng., S. A. L., Chelsea.
La Rue, Henry, Sr. Insp. Car Equip., Inter. Com. Com.
Lathrop, C. L., Supt. Tele. & Signal, P. S. & N., Princess.
Leonard, W. W., Supt. C. L., B. & O., Hayden.
Leppington, W., Asst. For., C. R. R. of N. J., New Brady House.
Lilley, Donald L., Supt., Int. T. C. C., Breakers.
Lindner, W. C., Chf. Car Insp., Penn., Chalfonte.
Linthicum, Frank, Asst. Road For. Engines, Penn.
Luers, H. L., Draft, B. & O.
Dynam, T. J., Secy. Asst. to Pres., N. Y. C., Marlborough.
Lynch, George, chf. Joint Insp. Car Dept., All Lines, Bouvier.
Lyne, S. F., F. C. D., P. R. R., Mt. Carmel.
McAfee, W. K., For. M. P. Dept.
McBrearty, Frank B., Gang Leader M. P. Dept., Penn.
McBrian, James, D. C. I., C. R. I. & R., Lexington.
McClelland, John W., Supt. of Signals, P. & R.
McDonnell, Dr. M. E., Asst. Chief Chemist, Penn.
McHugh, T. J., Secy. Supervisor Shops, B. & O., Elberon.
McPhail, O. G., M. M., A. B. & A., Traymore.
Mack, G. J., Mech. Supvr., U. S. Industrial Alcohol Co., Traymore.
Machab, E. S. M., Car Light. Eng., C. P. R., Craig Hall.
Mahar, Thomas, Traveling Engineer, American Arch., Traymore.
Mallard, J. T., M. M., N. S., Osborne.
Marks, G., Asst. to G. Mgr., N. Y. N. H. & H., Shelburne.
Martz, Edward R., B. & L. E., St. Charles.
Masters, J. A., M. C. B. Bill. Inst., S. A. L., Monticello.
Matthews, Wm. H., Jr., Asst. R. F. E., Penn., Melita.
Mattingly, E. H., J. G. C. F., B. & O., Edison.
Meskill, M. J., Engineer, Penn., Princess.
Messimer, N. B., S. S. R. S. Dept., N. Y. C., Princess.
Mewshaw, T. E., Gen. For., B. & O., Regent.
Meyer, W. C., Gen. For. Car Dept., Penn., Luella.
Midlaugh, W. H., D. C. F., Erie, Pennhurst.
Miller, A. T., C. C. to Supt. M. P., A. & W. P., Lexington.
Miller, B. E., Master Painter, D. L. & W., Alamac.
Miller, L. C., Gen. Car Foreman, B. & O., Lexington.
Miller, R. N., Asst. Eng., Penn., Princess.
Moncure, A. H., G. F. C. D. R. F. & R., Esplanade.
Morales, Sr. P. C., S. de F. M. y Mag., Mexican, Sterling.
Monroe, J. W., M. M., Penn., Mt. Carmel.
Moore, L. D., Elec. Engr., Mo. Pac., Craig Hall.
Morningstar, E. E., Draftsman, B. & O.
Moses, E. P., G. C. I., N. Y. C., Pennhurst.
Mudd, Frank X., Pres. & Gen. Mgr., Live Poultry Transit Co., Haddon Hall.
Mulcahy, C. W., Chf. Clerk, M. C., Breakers.
Nettles, E. H., C. C. to G. S., N. Y. C., Alamac.
Nickols, W. H., Chf. Insp. Car Dept., D. & H., Marlborough.
O'Connor, E. P., M. E., K. C. S., Princess.
O'Dea, P. J., Gen. Insp. Mech. Dept., Erie, Pennhurst.
Otter, John, Shop Supt., M. C., Shelburne.
Paignt, J. T., Gen. Oxweld Insp., N. Y. N. H. & H., Traymore.
Paskey, D., For. Insp., C. R. R. of N. J., Hamilton.
Patterson, W. J., Asst. Chief Bureau of Safety, I. C. C., Blackstone.
Rauk, Capt. J. M., Capt. U. S. A., Runnymede.
Peach, J. F., Supt. M. of E., B. & O., Alamac.
Peck, F. H., For., N. Y. C., Pennhurst.
Peck, W. F., S. A. B., B. & O., Mullica.
Peebles, Wm. L., Traveling Freight Agt., P. E. R.
Perry, M. R., Ch. Car Repair Acct., B. & O., Bouvier.
Pettit, A. M., Sec. to Gen. Mgr., N. Y. C., New Clarion.
Phipps, J. W., Gen. Pass. Car Insp., B. & O., Revere.
Piper, W. F., Asst. M. M., Penn., Haddon Hall.
Poor, Stephen W. E., Foreman, A. C.
Potts, Leroy C., Draftsman, P. & R.
Pratt, Ira D., G. F., Penn., Stanley.
Prettyman, A. J., E. F., N. Y. C. & H., Pennhurst.
Price, C. W., Asst. Car Ltg. Supervisor, B. & O.
Purcell, Mark, Gen. A. B. N. Pac., Marlborough.
Rasmussen, S. M., Chief Train Clerk, Penn.
Raudenbush, J. W., Acc. U. S. R. A., Silverton.
Raymond, A. A., Service Test Eng., N. Y. C.
Reed, M. R., M. M., Penn., Craig Hall.
Rice, Edward T., Tinancura Argentina.
Richards, E. C., Asst. to S. R. S., M. C., Shelburne.
Richards, S. R., M. M., N. Y. N. H. & H., Chalfonte.
Robb, E. H., Acting Asst. Engineer, L. I., Arlington.
Roderick, M. B., I. T. & M., Erie.
Romig, J. S., Asst. M. M., Penn.
Root, J. L., M. E., Union Tank Car Co., Traymore.
Ross, B. B., General Foreman, L. I., Devonshire.
Rush, R., Headlight Insp., N. Y. N. H. & H., Princess.
Rutland, C. B., Asst. R. F. E., Penn., Melita.
Sapirstein, Chas., Asst. Gen. For., L. I.
Saunders, T. A., Gen. For. Car Dept., Tennessee Central, Princess.
Schuyler, A. J., G. C. I., Virginian, Osborne.
Schwindy, H. H., G. F., Penn., Craig Hall.
Scotio W. C., Foreman, I. C., Kentucky.
Shaibley, C. K., Fireman Instructor, Penn.
Sheehan, J. E., Gen. Car Insp., N. Y. N. H. & H., Princess.
Shepherd, J., Asst. For., C. R. R. of N. J.
Sickel, Samuel R., Chief Clerk, P. & R.
Singleton, John H., S. H. L., Erie, Alamac.
Sindall, G. E. M., Asst. Gen. F., Penn.
Sloan, J. R., Chief Elect., Penn.
Smith, Abram E., M. C. B., Union Tank Car Co., Traymore.
Smith, H. E., Material Engineer, N. Y. C.
Smith, C. M., Tie & Timber Dept., N. Y. C., 160 States Ave.
Spinkler, Chas. F., Gang Leader, Penn.
Stackpole, W. S., G. S., Pub. Ser. R. R., Haddon Hall.
Stadelman, J. H., Asst. Eng., Penn.
Stanton, E., Ch. J. C. I., N. & P. Belt, Osborne.
Steele, Robert J., Supervisor of Signals, P. & R.
Steins, C. K., Asst. Eng. M. P., Penn., Pennhurst.
Stier, J. E., Leading Draftsman, B. & O.
Stoll, W. J., Chf. Inter. Insp., N. Y. Central Pennhurst.
Straub, C. F., Supt. Car Rep., P. & R., Lexington.
Stuart, Chas. W., Gang Foreman Elec. Dept., Penn., Dennis.
Stumpf, F. L., Gen. Air Brake & Steam Htg., Penn., Lexington.
Sullivan, T. L., Asst. to G. F. C. R., Erie, Pennhurst.
Sweeney, U. L., Asst. Ch. Clk. S. M. P., A. C. L., Traymore.
Swope, B. M., Asst. Eng. M. P., Penn., Seaside.
Tapman, W. H., Gen. Mech. Insp., B. & O., Arlington.
Taylor, C. M., Supt. Creosot. Plant, P. & R., Marlborough.
Thorpe, W. A. C., Indian State Rys., Strand.
Timpson, J. E., Insp., Long Island, Pine Hall.
Tobias, E. A., P. Agt., Chili State Rys., Strand.
Todd, John, C. F., Erie, Alamac.
Tudhall, J. H., Asst. Auditor, C. I. & W., Chelsea.
Turley, Wm. S. S., K. C. S., Princess.
Turley, Wm., Jr., K. C. S., Princess.
Van Aislun, H. M., Asst. Div. G. F., N. Y. C., Pennhurst.
Voight, A. E., Car Lighting Engineer, A. T. & S. F., Arlington.
Walker, H. J., Auditor of Expenditures, Penn., S. Massachusetts Ave.
Walker, J. W., Ch. Air Brake Insp., Penn.
Wall, Geo., Elec. F. M. P. & E., D. L. & W.
Walsh, J. J., M. M., Penn., Elberon.
Walther, A. G., A. S. S., B. & O., Haddon Hall.
Walton, J. O., Elect. Eng., Seaboard Air Line, Princess.
Wakefield, O. C., Jr., N. P., Seaside.
Warden, H. M., Supt. Reclamation, N. K. T., Chelsea.
Warnecke, J. G., D. S. K., I. C., Esplanade.
Warner, Bruce M., Exhibition Mgr. & Secy., Bakery Equip. Mfg. Assn., Ambassador.
Warner, W. W., S. S., Erie, Princess.
Waugh, J. E., Asst. Chf. Clk. G. S. K., B. & O., Hillcrest.
Weaver, W. M., Conductor, Seaboard Air Line, Princess.
Weightman, J. J., Ch. Clerk, P. & R.
Wells, A. P., E. T., C. of G., Pennhurst.
Wells, L. S., Supt. Tele. & Elec., L. I., Breakers.
Wenzel, C. F., F. F. C. I., Penn.
Wertman, John, Foreman, Penn.
Wescot, F. B., Ch. Car Insp., Penn., Craig Hall.
Wildrick, F. B., C. C. to M. S., Erie, Chalfonte.
Williamson, G. B., C. R. Acct., B. & O., Bouvier.
Wilson, O. A., C. C. I., Penn., Elberon.
Winfield, J. H., Gen. Insp., Erie, Martinique.
White, E. E., G. C. I., Penn., Princess.
White, E. P., Test Supervisor, N. Y. N. H. & H., Chelsea.
White, G. A., Asst. M. P. C., P. B. & W., Chalfonte.
Whitman, R. C., Insp., B. & O.
Wilbur, F. T., Supt. of Tel., I. C., Breakers.
Williams, Edgar, P. & R., Arlington.
Winding, E. G., Insp. Test Dept., C. M. & St. P.
Wood, G. H., Gen. Air Brake Insp., A. T. & S. F., Fredonia.
Wood, H. I., Chief Draftsman, N. Y. C.
Wortman, J. R., Supply Clerk, B. & O., Haddon Hall.
Wrenshall, John C., Jr., Div. Engineer, P. & R.
Yarwood, J. G., For. Hostlers, Long Island.
Yates, R. C., Haddon Hall.
Yeager, J. P., Gen. Car Foreman, P. S. & N., K. C.
Yeager, J. R., Gen. Foreman, W. M. R. R., Monticello.

(See also other registrations elsewhere in this issue)

Supply Train Movie at Three O'clock

THE SOUTHERN PACIFIC, Pacific System, has developed a system of delivering material to fill the monthly requisitions of the maintenance of way and bridge and building departments, pumping stations and station agencies by the use of a supply train, which has resulted in a saving of over \$11,000 a month as compared with the practice of delivering supplies in way freight trains. The operation of this train will be shown by a six-reel moving picture at the afternoon session of Section VI—Purchases and Stores—in the Hippodrome to-day. Members of Section III—Mechanical—are invited to witness the picture, which will be shown at three o'clock and will require about one hour and ten minutes. The operation of this train has developed many advantages other than the saving in the expense of delivering materials, and while the picture does not show them all, it is suggestive of the great possibilities by the supply train scheme.

A Tribute to Eugene Chamberlain

W F. JONES, general storekeeper of the New York Central at West Albany, N. Y., paid the following touching tribute to the late Eugene Chamberlain at the opening session of Section VI yesterday morning:

Eugene Chamberlain, an honored member of this Association, a member of the Master Car Builders' Association, past president of the New York Railway Club, and of the Central Railway Club, has gone beyond, and we take this hour to publicly testify to his worth as a citizen and to give credit for the many good things he did for this Association.

You will remember the big jovial, whole-souled "Gene," the man who many times at our annual conventions related his experiences, gave you advice and with his benediction sent you to your homes with light hearts and with the firmer conviction that life was worth living.

His life was one of devotion to his family, his church and his friends. He had a high regard for his citizenship and endeavored to so live that his ideal could be attained.

The same patriotic spirit that led his father to respond with alacrity to the first call for troops in the Civil War, was duplicated in the son, and induced him before he was out of his "teens" to enter the ranks of the Federal army, but like many others he was laid low, by camp disease, and disqualified for the brave service he would have given had it been otherwise. He was always sensitively reticent with regard to being unable to fight as well as serve for the preservation of the Union, and few

there were until after his life was ended, even among his most intimate acquaintances, who knew he was a veteran of that great struggle for the Stars and Stripes.

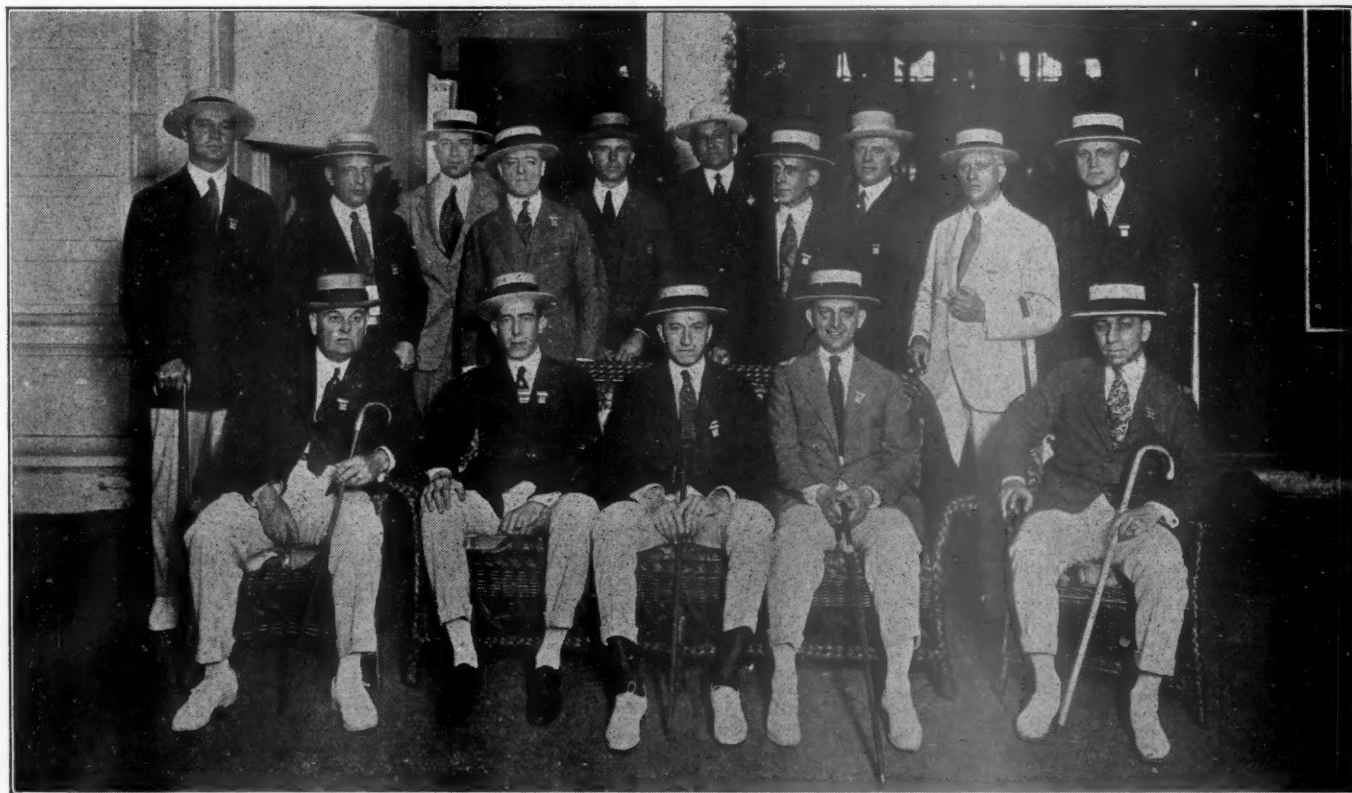
He knew the frailties and shortcomings of humanity, and while he would not condone a willful fault, he was generous in his sympathy for one who would fall and helpful by kindness and advice to those who needed assistance.

Many men, among them myself, can truthfully say that to him they are indebted for wise counsel and advice which aided them in their struggle for success.

He was not a dreamer, but he had a broad vision in connection with a keen intellect, and he was also a reader of character. His trying experiences in his younger days, coupled with his successes of after years, gave him a diversity of knowledge that enabled him to pass upon questions promptly, intelligently and effectively.

He was active in his duties when he became a member of this Association, which membership he prized so highly, for he realized we were an organization of men devoted to our calling with high ideals and with progress and service as our watchwords. He wanted to be one of this group of men that he could better and to a greater extent aid us in our endeavors. Aid us he did, and to him we owe a debt that cannot be paid. He gave us incentives for work which led to progress, he gave us service which we are passing along. His work will endure since he gave us the fundamentals on which we built our structure and this structure still stands.

It was in the flesh that he answered his first roll-call. He is not here to respond to-day. He is enrolled in the Great Beyond, his name in shining letters. He answers only to his Maker.



Enrollment Committee

Top Row, Left to Right—L. D. Mitchell, Detroit Graphite Company; F. H. Smith, Gold Car Heating & Lighting Co.; F. C. Koch, *Railway Age*; S. H. Campbell, Western Railway Equipment Co.; S. Inglis Leslie, the Leslie Company; F. E. Dodson, U. S. Rubber Co.; Harry Jacques, Simmons Hardware Co.; Geo. W. Denyven, Boston, Mass.; James A. Stevens, DeVoe & Reynolds Co., and C. L. Bates, *Railway Review*.
Bottom Row, Left to Right—Geo. A. Barden, Duntley Pneumatic Tool Co.; H. K. Williams, Safety Car Heating & Lighting Co.; Chas. H. Gayetty, Chairman, Quaker City Rubber Co.; Jos. E. Brown, O'Malley-Beare Valve Co.; F. V. McGinness, Transportation Engineering Corporation.

Registration, American Railroad Association

Section III, Mechanical

Adamson, E. A., M. C. B., C. of C., Pennhurst.
 Arp, A., Gen. For., Penn., Craig Hall.
 Attridge, O. T., M. M., Georgia, Lexington.
 Baker, Geo. T., G. C. I., Penn., Worthington.
 Barnes, P. H., G. C. E., B. & O., Warnick.
 Barr, L. S., S. C. D. Live Poultry Transit Co., U. S. Yards, Haddon Hall.
 Barrett, R. W., G. F. C. D., N. & S., Princess.
 Barthelmy, P. P., A. G. C. E., G. N., Marlborough.
 Bean, W. L., Mech. Asst. to Pres., N. Y., N. H. & H., Ambassador.
 Beaghen, Thos., Mexican Petroleum Corp., Traymore.
 Beaumont, H. A., G. F. C. D., B. & O., Haddon Hall.
 Bentley, W. F., Bouvier.
 Bettcher, W. H., M. C. B., C. I. & W., Chelsea.
 Brady, C., E. C. C., C. P., Fredonia.
 Brady, J. F., Asst. M. M., B. & O., Regent.
 Burch, J. J., G. F. C. D., N. W., Traymore.
 Burrell, W. C., M. M., B. & O., Sterling.
 Calder, W. W., M. C. B., B. & O., Haddon Hall.
 Carmer, J. R., G. F., P. B. & W., Princess.
 Carty, F. J., M. E., B. & A., Alamac.
 Caton, S. W., G. C. I., Western Maryland, Monticello.
 Clark, I. N., M. C. B., G. T., Chalfonte.
 Coffman, B. J., Asst. M. E., R. F. & P., Princess.
 Corinth, A. B., G. C. I., A. C. L., Shelburne.
 Coulter, A. F., Gen. Car For., Union, Channel.
 Courson, J. F., G. F. Wall Shop, Penn., Seaside.
 Craig, James, Ch. Draft, B. & M., Colonial.
 Cunningham, J. L., S. M. O., Penn., West Div., Traymore.
 Curran, J. W., Dist. M. C. B., B. & O., Princess.
 Davis, A. S., Supt. M. P., Penn., Devonshire.
 Deems, W. A., M. M., S. I. R. T., Haddon Hall.
 Demarest, T. W., G. S. M. P., Penn., Brighton.
 Dickinson, F. W., M. C. B., B. & L., St. Charles.
 Ditmore, Geo. W., D. & H., Marlborough.
 Downing, I. S., G. M. C. B., C. C. & St. L., Traymore.
 Dugan, G. A., M. M., P. & R., Dennis.
 Eberle, Wm. F., G. F., Penn., New Princess.
 Ewald, Wm., Supt., M. P., C. & P., Osborne.
 Fetner, W. H., S. M. P., C. of G., Traymore.
 Fisher, D. Wallace, Motive Power Insp., P. & R., Dennis.
 Fouse, F., N. C. B., G. T., Ambassador.
 Fox, Geo. P., Shop Supt., N. Y. C., Pennhurst.
 Fravel, Geo. B., Supt. M. P., Penn., Dennis.
 Freeman, J. D., G. F. C. D., Sunset Central, Strand.
 Fry, Lawford H., Standard Steel Works.
 Frye, A. D., S. M. P., P. & N.
 Gordon, H. D., Marlborough.
 Gosnell, C. B., C. C. F., Morgantown & Kingwood, Augustine.
 Goss, W. F. M., Pres. Ry. Car Mfg. Assn., Marlborough.
 Gray, C. B., M. M., Penn.
 Greenwood, B. E., S. S., Seaboard Air Line, Princess.
 Gross, E. G., M. M., C. of G., Blackstone.
 Gutteridge, J., Gen. Car For., K. C. S., Princess.
 Halbert, M. W., Chf. Interchange Inspector, Haddon Hall.
 Hampton, J. N., F. C. D., A. C. L., Osborne.
 Hanlin, J., M. M., S. A. L., Princess.
 Harvey, H. H., G. C. F., C. B. & O., Chelsea.
 Hayes, A. C., F. G. C. F., N. Y. C., Pennhurst.
 Hellman, Chas., G. C. F., Pitts. & Shawmut, Terminal.
 Henry, J. M., A. C. S. M. P., Penn., Traymore.
 Hildreth, Fred F., A. E. M. P., P. C. C. & St. L., Craig Hall.
 Hodges, A. H., M. M., B. & O., Arlington.
 Jackson, R. E., S. M. P., Virginian, Traymore.
 Jenkins, E. M., M. E., Virg., Traymore.
 Jennings, J. F., Asst. S. M. P., M. C., St. Charles.
 Johnson, J. O., Southern, Fredonia.
 Jones, E. S., Gen. Car Insp., B. & A., Pennhurst.
 Joy, C. U., M. M., N. Y., N. H. & H.
 Keene, J. C., Chf. Car Insp., Wabash, Alamac.
 Kent, F. S., G. C. I., Penn., Marlborough.
 Keppelmann, H. S., G. C. I., P. & R., Chalfonte.
 Kimmitt, M. A., G. F. C. D., C. R. R. of N. J., Avondale.
 Kittle, Walker, Gen. For., Penn., Princess.
 Lentz, J. S., M. C. B., L. V., Dennis.
 Levesque, Geo. F., M. M., G. M. & So., Princess.
 Lindley, W. M., Asst. M. M., Penn., Craig Hall.
 McCullough, M. M., M. M., Penn.
 McGahey, R. E., M. M., Washington & Southern, St. Charles.
 McGary, Alex., G. F. E. C. L. E., N. Y. C., Breakers.
 McGunty, T. M., Gen. For. Car Insp., Penn., Princess.
 McIlvaine, C. L., S. M. P., Northern Div. Penn., Brighton.
 McIntosh, J. W., M. M., N. Y., N. H. & H., Princess.
 McMillan, A. E., M. M., B. & O., Arlington.
 McMullen, J., S. C. D., Erie, Ambassador.
 Maddox, C. W., C. C. I., C. & O., Chalfonte.
 Manderson, A. R., A. S. M. P., Maine Central, Chelsea.
 Martin, K. H., Gen. Equip. Insp., Southern, Breakers.
 Mehan, J. E., Gen. Car For., C. M. & St. P., Strand.
 Mengel, J. C., M. M., Penn., Chelsea.
 Meyers, Samuel, G. S. K., L. & H., Holmhurst.
 Miller, E. T., G. C. I., D. & M., Colonial.
 Miller, E. N., Motive Power Insp.
 Minick, Eli, Genl. Foreman, Atlantic City, Monticello.
 Montague, W. T., M. Mech., Penn., Marlborough.
 Moore, A. F., Gen. For. Car Dept., Penn., Princess.
 Mounce, R. S., G. F. C. R., Erie, Pennhurst.
 Nelson, F. W., M. M., N. Y., N. H. & H., Princess.
 Nevins, B. E., M. M., Virginian, Osborne.
 Nowell, H. T., M. S., Cent. Vt., Elwood.
 Nystrom, K. F., Engr. Car Constr., Grand Trunk, Ambassador.
 O'Donnell, T. J., Arbitrator, N. F. C. I., Pennhurst.
 Onderdonk, J. R., Eng. Tests, B. & O., Traymore.
 Palmer, L. W., M. M., East Broad Top, Richmond.
 Pardue, W. J., M. C. B., Seaboard, Chelsea.
 Parks, O. J., G. S., Gen. Amer. Tank Car, Haddon Hall.
 Pattison, J. H., Gen. For., N. & W.
 Patton, C. S., S. M. P., Seaboard, Chelsea.
 Penderton, Harry J., Asst. M. M., Penn., Craig Hall.

Peters, J. W., M. C. B., G. T., Marlborough.
 Pitt, W. A., Gen. M. C. B., G. T., Ambassador.
 Porcher Samuel, P. A., Penn., Traymore.
 Potts, C. H., P. R. R., Chalfonte.
 Quinn, J. H., G. F., Penn., Princess.
 Quinn, M. H., G. M. S., Erie, Pennhurst.
 Ramage, J. C., Supt. Tests, Southern, Southland.
 Reed, James, M. C. B., N. Y. C., Breakers.
 Renner, C. W., A. G. F. C. S., Penn., Princess.
 Rockfellow, W. E., D. C. F., N. Y. C., Pennhurst.
 Roush, C. S., Gen. Foreman, Buffalo Div., Penn.
 Senger, J. W., S. R. S., N. Y. C., Esplanade.
 Schrader, J. P., G. C. F., N. Y. C., Strand.
 Shackford, J. M., C. D., D. L. & W., Traymore.
 Simms, H. A., Mech. Supt., Amer. Ry. Exp., Chalfonte.
 Slagle, C. G., S. M. P., C. I. & W., Chelsea.
 Smart, G. E., G. M. C. B., C. N., Ambassador.
 Smith, J. C., M. M., Western Md., Grand Atlantic.
 Spoor, C. E., M. C. B., B. & S., Somerset.
 Stewart, T. R., Shop Supt., B. & O., Haddon Hall.
 Sugg, Chas. R., E. E., Coast Line, Marlborough.
 Taylor, F. C., G. C. I., P. B. & W., Berkshire Inn.
 Thomas, I. B., P. A., Penn., Traymore.
 Thompson, Geo., M. C. B., N. Y. C., Breakers.
 Thorn, W. H., M. C. B., C. St. P. M. & O., Pennhurst.
 Tierney, H. J., Traymore.
 Trapnell, F. W., C. I. I., Kansas City Car, Chalfonte.
 Vittum, J. E., Ch. Joint Inspector, Columbus, Colwyn.
 Walker, Wm., Supt. Shop, M. K. & T., Blackstone.
 Wagoner, J. V., M. M., Georgia Florida & Alabama, Arlington.
 Weight, G. C., G. C. I., Penn., Garden Inn.
 Wiese, A. J., Dist. M. C. B., B. & O., Alamac.
 Yergy, J. P., G. F. C. S., Penn.

Section VI, Purchases and Stores

Abel, A. W., Stat. S. K., Penn.
 Agner, R. L., D. S. K., Southern, Schlitz.
 Aikens, B. A., P. A., M. C., Ambassador.
 Baldwin, C. D., P. A., B. & A., Alamac.
 Ballinger, A. L., Storekpr., Penn., Craig Hall.
 Barrows, C. D., P. A., Maine Cent., Ambassador.
 Beernett, C. D., Storekeeper, Western Maryland, Elberon.
 Bender, E. N., G. P. A., C. P., Marlborough.
 Bennett, J. L., P. A., C. of G., Traymore.
 Berry, H. K., P. A., C. & I., Alamac.
 Blackburn, R. M., G. S. K., C. & N. W., Chalfonte.
 Bogan, J. E., D. S. K., Mo. Pac., Strand.
 Bond, J. L., Div. Store, Penn., Craig Hall.
 Brady, W. E., Ch. Acct., A. T. & S. F., Princess.
 Brown, N. J., S. K., B. & S., Somerset.
 Brown, R. W., D. S. K., C. C. & O.
 Burr, H. S., Gen. Super. of Stores, Erie, Esplanade.
 Butterworth, Jos. A., Ch. Cl. to P. A., So. Ry., Grand Atlantic.
 Byron, J. E., G. S. K., H. & M., Monticello.
 Clark, J. E., S. K., Erie, Lexington.
 Creel, C. C., Div. S. K., Penn., Princess.
 Dale, A. R., Genl. Storekeeper, Florida East Coast, Marlborough.
 Daniel, A. D., P. A., A. B. & A., Marlborough.
 Davis, C. L., S. K., D. L. & W., Arlington.
 Davis, H. G., Store, Erie, Blackstone.
 Dawson, V. N., Div. Sk., B. & O., Pennhurst.
 Deery, James, Asst. to Pur. Agt., Penn.
 Dearnam, W. M., D. S. K., S. A. L., Princess.
 Dewart, H. M., P. A., C. V., St. Charles.
 Dibble, C. C., Supt. of Stores, N. Y. C., Traymore.
 Dickinson, T. R., D. S. K., B. & L. E., St. Charles.
 Dixon, W., Insp. of Stores, Miss. Pac., Strand.
 Drayton, H. S., D. S. K., N. Y., N. H. & H., Princess.
 Elder, S. M., Asst. Ticket Agent, B. & O., Haddon Hall.
 Enscol, John R., Trav. Storek., N. Y., N. H. & H., Princess.
 Fechter, F. H., P. A., A. C. L., Chalfonte.
 Feemster, J. L., G. S. K., C. G. W.
 Fisher, O. D., Div. Store, Penn.
 Fitzpatrick, Wm. H., Trav. Store, C. & N. W., Chalfonte.
 Foley, F. I., Gen. Stores Acct., N. Y., N. H. & H., Princess.
 Forde, T. J., Hog Island Belt, Shelburne.
 Foss, N. C., P. A., G. T. W. L., Marlborough.
 Frazee, W. H., Ch. Acct. P. A. Dept., Penn.
 Frier, T. J., P. A., Wabash, Marlborough.
 Gage, A. M., S. K., Lake Erie & W., Princess.
 Gaines, E. C., For., M. P., N. & W.
 Galleher, J. W., Asst. Store, Erie, Freemont.
 Galloway, W. S., P. A., B. & O., Ambassador.
 Garnett, J. E., D. S. K., Southern.
 Gerber, J. W., G. S. K., Southern, Traymore.
 Godard, E. E., Asst. Eng. Elec. Car Ltg., Penn.
 Goodchild, A. A., G. S. K., C. P., Marlborough.
 Graham, R. K., Gen. Supt., A. T. & S. F., Princess.
 Graham, W. A., P. A. & S. K., Temisk. & No. Ont., Wilmington.
 Greetham, E. S., S. K., Quebec, Mont. & S., Princess.
 Grier, G. W., D. S. K., Southern, Schlitz.
 Grubbs, F. C., Div. Stkr., Penn., Blackstone.
 Hadley, A. W., Supt. Recia Plant, N. Y., N. H. & H., Princess.
 Harris, P. D., Local S. K., Mich. Cent.
 Harris, R. C., G. S. K., Penn. Central Region, Traymore.
 Hartzell, J. L., Div. Store, West Md., Wiltshire.
 Harvey, Wm. A., Div. S. K., Penn., Craig Hall.
 Heazlitt, B. Y., Pur. Dept., Ky. & Ind. Ter., Traymore.
 Herbau, M. V., Dist. Store, Ann Harbor, Regent.
 Hiner, W. J., P. A., C. C. & St. L., Marlborough.
 Hinkley, W. M., Supt. of Materials, B. & O., Blackstone.
 Hisatome, Yoshisato, S. K., Imp. Gov. Rys. of Japan, Breakers.
 Hodges, H. B., P. A., L. I., Esplanade.
 Holmes, A. M., P. A., Lehigh & H. R., Chalfonte.
 Hubbell, C. C., P. A., D. L. & W., Ambassador.
 Huff, R. H., Local S. K., Mich. Cent.
 Hughes, E. S., Fuel Agent, A. B. & A., Marlborough.
 Jackson, J. C., G. S. K., G. T. West Lines Blackstone.
 Jellison, B. T., G. P. A., C. & O., Marlborough.
 Jones, M. G., Div. Storekeeper, Penn.
 Justice, H. B., Storekeeper, Penn., Avon Inn.
 Karl, J. H., S. K., Erie, Craig Hall.
 Kavanagh, D., G. S. K., Union, Esplanade.
 Kelly, T. F., Road. Stkr., N. Y., N. H. & H., Princess.
 Kemmerling, B. B., Dist. Storekeeper, Penn., Craig Hall.

Special Guests

- Kenneq, M. C., V. P. Charge Pur., Penn.
 Kennedy, M. C., Jr., Penn.
 Kilgore, John W., Div. S. K., Penn., Craig Hall.
 Kincaid, C. R., Div. S. K., B. & O., Alamac.
 King, B. C., Gen. Storekeeper, Virginian, Strand.
 Kinnear, G. W., Gen. Store., Penn.
 Kohler, L. G., Div. Storekeeper, B. & O., Blackstone.
 Krezschmer, E. E., P. A., Chicago L., Alamac.
 Kreglow, A. F., Store., Wash. Term. Alamac.
 Kukis, John J., Storehouse Insp., Erie, Marlborough.
 Landers, E. H., G. S. K., C. C. C. & St. L., Traymore.
 Lawton, E. W., Storekeeper, Penn.
 Lehesch, G. H., Div. Storekeeper, Penn.
 Lewis, H., Mgr. P. & S., C. I. & W., Chelsea.
 Lithgow, J. A., S. K., B. & M., Monticello.
 Lovett, C. C., S. K., B. & H.
 Lynch, J. F., Storekeeper, C. R. R. of N. J., New Brady House.
 McAndrew, R., G. S. K., D. & L. E., St. Charles.
 McCall, P. F., Gen. Storekeeper, Chicago, Alamac.
 McCann, J. L., Supt. Reclamation Plant, B. & O., Pennhurst.
 McCarthy, J. H., Dist. S. K., W. J. & S., Malatesta.
 McDonald, J. J., Gen. Storekeeper, C. P. & St. L., Marlborough.
 McGough, P. J., Div. Storekeeper, P. & R.
 McKeand, C. H., P. A., Toledo Term., Breakers.
 McMahon, John E., G. S. K., C. St. P. M. & O., Princess.
 McQuade, H. J., P. A., L. V., Ambassador.
 McQuilkin, H. P., G. S. K., B. & O., Haddon Hall.
 Marshall, J. F., P. A., C. & A., Haddon Hall.
 Meyers, Samuel, Jr., G. S. K., L. & H., Holmhurst.
 Michael, W. B., D. S. K., Southern, Schlitz.
 Miller, E. J., Store., Erie, Traymore.
 Mills, O. B., Genl. Storekeeper, Penn., Blackstone.
 Minton, W. F., D. S. K., Southern, Schlitz.
 Mitchell, W. R., A. S. K., Erie, Lexington.
 Moore, Tom, P. A., Virg., Traymore.
 Morgan, D. C., Jr., Pur. Agt., Pittsburg & Shawmut, Dennis.
 Moser, H. S., Store., W. M., Wiltshire.
 Munster, A. W., P. A., B. & M., Ambassador.
 Murphy, F. A., D. S. K., B. & O., Seaside.
 Nettles, W. B., D. S. K., Southern, Schlitz.
 Nicodemus, E. H., Dist. Stkr., Penn., Blackstone.
 O'Connor, F. J., Asst. Gen. Storekeeper, C. M. & St. P., Fredonia.
 Otto, C. A., Equip. Agt., Penn.
 Pace, R. T., P. A., A. & W. P., Ambassador.
 Pearce, H. C., C. P. A., Seaboard Air Line, Marlborough.
 Phillippe, B. P., A. P. A., Penn., Chelsea.
 Porcher, S., G. P. A., Penn., Traymore.
 Pitrer, E. L., S. K., Sav. & Atla., Haddon Hall.
 Pomeroy, R. L., Div. S. K., Penn.
 Price, E. H., Asst. to G. S. K., N. Y., N. H. & H., Princess.
 Quigley, G. V., S. K., A. A., Regent.
 Rainie, H. M., A. S. K., B. & M., Rothwell.
 Rankin, Ray, Asst. Store., Erie, Sea Crest.
 Ray, H. B., G. S. K., A. T. & S. F., Traymore.
 Ray, H. C., Dist. Store., Penn., Wiltshire.
 Reardon, F. C., Supt. of Stores, D. & H., Princess.
 Reed, C. B., Gen. Storekeeper, P. & S., Chalfonte.
 Reyno, E. R., Storekeeper, Camden, Penn.
 Richie, C. A., S. K., Erie, Lexington.
 Roberts, E. G., Div. Store., R. I., Continental.
 Robinson, E. C., A. P. A., O. J., Princess.
 Rook, D. E., Dis. Storekeeper, Penn., Blackstone.
 Ruston, W. E., Supt. Stores, B. & M., Monticello.
 Scott, F. L., P. A., L. V. C. Co., Ambassador.
 Seaybe, H. J., Asst. P. A., B. & M., St. Charles.
 Secor, G. A., G. S. K., C. & A., Haddon Hall.
 Sedwick, T. D., Eng. of Tests, C. R. I. & P., Traymore.
 Sheehan, M. L., S. K., B. & A., Alamac.
 Shoemaker, H., S. K., B. & O., Blackstone.
 Sitgreaves, G. W., G. S. K., L. & N. E., Pennhurst.
 Smith, Harry C., Storekeeper, Penn., Esplanade.
 Smith, J. H., Div. Storekeeper, Southern, Schlitz.
 Sowell, A. W., B. S. K., C. of G., Pennhurst.
 Stanwood, W. E., Storekeeper Pavonia Shops, Penn.
 Starrett, W. A., P. A., C. C. & O.
 Stokes, W. D., A. G. S. K., I. C., Esplanade.
 Stout, Harry D., Insp., Penn.
 Stowasser, W. H., S. K., C. & O., Osborne.
 Stuart, J. G., G. S. K., C. B. & O., Esplanade.
 Sutton, G. W., S. K., C. & O., Davenport.
 Sweeney, J. H., Supt. Stores, Erie, Marlborough.
 Talbot, F. J., Supt. Stores, Erie, Breakers.
 Taylor, C. M., Div. Stkr., Penn., Blackstone.
 Tice, H. E., S. K., Erie, Alamac.
 Tillett, A. A., Dis. Stkr., Penn., West, Esplanade.
 Tobey, C. B., A. G. K. S., L. V., Belfort.
 Thomas, I. B., P. A., Penn., Traymore.
 Traister, W. G., S. K., Staten Island R. T.
 Trimble, R. D., Storekpr., B. & A., Pennhurst.
 Tucker, F. B., S. K., Erie, Breakers.
 Vaughn, A. C., S. K., Erie, Monticello.
 Wagner, A. C., S. K., Erie, Alamac.
 Wagner, John M., P. A., Copper Range, Haddon Hall.
 Walker, E. G., A. P. A., A. T. & S. F., Dennis.
 Walsh, P. H., G. S. K., A. G. L., Chalfonte.
 Walther, A. D., Gen. Storekeeper, T. P., Haddon Hall.
 Warden, H. M., Supt. Reclamation Plant, M. K. & T., Chelsea.
 Warne, C. C., A. P. A., N. Y. C., Traymore.
 Wart, W. C., D. S. K., B. & O., Alamac.
 Waterman, J. H., Supt. Tim. Pres., C. B. & O., Haddon Hall.
 Whalen, T. F., D. S. K., N. Y., N. H. & H., Princess.
 White, Geo. D., Storekeeper, Penn., Traymore.
 Williams, D. A., Asst. to P. A., B. & O., Strand.
 Wnyder, G. W., 2d, G. S. K., Penn., Fredonia.
 Wonnell, G., Dept. Storekeeper, Penn., Blackstone.
 Workman, E. A., D. S. K., B. & O., Arlington.
 Wright, Eugene, G. S. K., L. I., Esplanade.
 Yeamans, C. W., P. A., C. & W. I., Dennis.
 Yeomans, Geo. G., S. A. to Pres., N. Y., N. H. & H., Esplanade.
 Young, C. D., Gen. Supt. of Stores, P. H., Brighton.
 Young, Wm. H., Storekeeper, Penn.
- Abbott, R. B., Asst. Gen. Supt. P. & R., 5465 Ventnor Ave.
 Abrams, H. N., Gen. For. M. P. Dept., L. I.
 Ale, E. R., Foreman Elec. Laboratory, Penn., Marlborough.
 Anderson, A. L., Enginehouse For., L. I.
 Anderson, H. A., Asst. E. M. P., Penn., Morton.
 Andrews, S. B., Engineering Act., Virginian, Monticello.
 Armstrong, A., Ch. C. I., So., Princess.
 Arnold, Harry M., Acct. Off. General Storekeeper, P. & R.
 Attridge O. C., Georgia, Lexington.
 Barnum, Ward, Senior Elec. Engr., Interstate Com. Com., Chalfonte.
 Bear, C. A., Pass. For., N. Y. C., Pennhurst.
 Beasley, S. F., M. C. B., Sinclair Ref. Co., Strand.
 Beaumont, J., Representative, Chilean State Rys. Marlborough.
 Bebout, C. W., Elec. & Shop Eng., C. & O., Chalfonte.
 Beck, Jos., Chf. Electrician, D. & I. R., Dennis.
 Berder W. A., G. C. F., B. & O., Arlington.
 Bennett, H. J., G. F., Penn., Princess.
 Benson, I. N., S. M. C., N. Y., N. H. & H., Breakers.
 Bernhardt, C. F. M., F. C. D., Georgia, Lexington.
 Blair, Geo. A., V. P., Wilson Car Lines, Haddon Hall.
 Blanchard, W. P., Asst. M. C. B., Sinclair Ref. Co., Strand.
 Blierne, G., For. C. I. R. R. of N. J., Mt. Vernon.
 Bone, A. H., Inspecting Engr., Egyptian State Rys.
 Borer, F. J., For. Frt. Shop, C. R. R. of N. J., Terminal.
 Borland, W. D., Ch. Bureau of Safety, I. C. C., Blackstone.
 Borup, O. V., Draftsman, B. & O., Arlington.
 Boucher, E. F., Gen. For. Loco. Repairs, Wash. Terminal Co., Elberon.
 Bowers, B. A., Term. Asst. M. M., B. & O., Regent.
 Boyd J. W., Welder Foreman, B. & O., Haddon Hall.
 Boyer, L. K., Gen. Car. F., B. & A., Pennhurst.
 Brackett, C. A., Gen. Foreman, Penn., Princess.
 Bradley, E. J., M. P. For., Penn.
 Bright, E. Y., Asst. Shop For., Penn.
 Bromley, Joseph, Insp., I. C. C., Blackstone.
 Brong, J. E., Shop Supt., L. V., Dennis.
 Brown, B. S., A. E., Penn., Princess.
 Brown, J. B., M. M., S. A. L., Osborne.
 Budd, W. B., A. E. M. P., Penn., Cheltenham-Revere.
 Buggle, M. J. W., Sec. to Gen. Mgr., C. I. & L.
 Burchett, B. J., Traffic Mgr., Shaffer Oil & Refining Co., Breakers.
 Burns, R. C., Asst. Eng., Penn., Haddon Hall.
 Burns, W. N., Eng., Retired, Penn., Haddon Hall.
 Burton, G. H., M. M., Pa., Chalfonte.
 Butler, W. A., Storekeeper, B. M., Monticello.
 Butts, H. M., Foreman, N. Y. C., Pennhurst.
 Callahan, P. J., S. C. & L. E. L., B. & M., Marlborough.
 Case, E. J., A. S. S., B. & O., Traymore.
 Case, T. G., Asst. G. F., N. Y. C., Pennhurst.
 Cashman, E. A., Asst. For. M. P. Dept., P. & R., Princess.
 Chapin, E. S., Safety Ins., Penn.
 Chestney, W. H., F., Penn., Elberon.
 Clement, S. B., Ch. Eng. & Supt. Maintenance, T. & N. Ontario, Breakers.
 Clugston, W. L., Asst. M. M., B. & O., Princess.
 Coppell, H. O., For. Car. Lgt., N. Y., N. H. & H., Princess.
 Coyle, C. H., Asst. to Pres., Gen. American Tank Car Corp., Haddon Hall.
 Craig, J. M., Gen. Elec., Penn., Shelburne.
 Crams, S. C., F. C. D., B. & O.
 Cratzer, C. A., Special Rep., Penn., Atlantic City.
 Cromwell, E. G., Dis. M. P. Ins. B. & O., Haddon Hall.
 Cumberley, H. C., Foreman, Penn.
 Cullen, P. V., Foreman Stations Central Div., C. R. R. of N. J., Vernon.
 Daily, J., Asst. B. F., C. R. R. of N. J., Brady House.
 Davis, W. H., M. E., N. Y. O. & W., Craig Hall.
 Deal, A. W., A. B. I. & M. E., P. & R.
 Delaney, T. F., Supt. Shops, B. R. T., Strand.
 Dildine, E. E., Gen. Foreman, Penn., Chelsea.
 Diltmore, A., For. C. D., D. & H., Monticello.
 Dixon, W. J., Gen. For., B. & O., Princess.
 Doarnberger, J. A., Master Boiler Maker, N. & W.
 Dodds, T. D., Chief Clerk, B. & O., Regent.
 Donoghue, C. H., A. D. G. F., N. Y. C., Pennhurst.
 Donoghue, S. J., A. B. D., N. Y. C., Pennhurst.
 Donoghue, Thos., G. C. F., N. Y. C., Fredonia.
 Dunn, Col. B. W., Chief Inspector, Bureau of Explosives, Marlborough.
 Eaton, E. S., Clk. Trans. Dept., Penn., Kenderton.
 Eklund, F. O., Asst. Supt. Shops, B. & O., Kingston.
 Elvin, A. C., B. F., D. L. & W., Princess.
 Emrich, Geo. S., Asst. M. M., Penn., Alamac.
 Enright, Lieut. Com. E. F., U. S. Navy, Dennis.
 Esterly, Wm. D., Draftsman, F. & R., Chelsea.
 Evans, E. B., Insp., Penn., Dennis.
 Ewald, Frank, Mech. Dept., C. & P., Osborne.
 Fahnestock, McClure, Asst. M. M., Penn.
 Farling, E. S., Asst. Div. Gen. Car For., N. Y. C., Clarendon.
 Fentress, H. S., G. C. I., N. & S., Osborne.
 Ferderber, L. J., Gen. Asst. Sales Mgr., Gen. Amer. Tank Car, Haddon Hall.
 Ferrier, N. A., Supvr. Shop Machy. & Tools, N. Y. Central, Haddon Hall.
 Filippino, F. P., Foreman, B. & O., Regent.
 Fluhrer, J. A., Div. Car Insp., N. & W., Summerset.
 Foley, John, Forester, Penn., Marlborough.
 Foid, J. F., For., B. & O.
 Fries, W. F., Gen. Car For., Shaffer Oil & Ref. Co., Alamac.
 Galloway, C. W., V. P., B. & O., Marlborough.
 Gerbounoff, S. T., M. E., Member of Russian Mission, Terminal.
 Gilliland, G. W., M. M., Seaboard Air Line Princess.
 Gillies, W. H., Gen. A. B. Insp., L. I.
 Gleeson, M. A., M. M., B. & O., Osborne.
 Goldsmith, Geo., S. S., Erie, Alamac.
 Goodwin, C. T., Air Brake Ins., B. & O., Windsor.
 Grant, J. E., Insp., Bureau of Expl.
 Graves, B. C., Manager Car Lines, U. S. Industrial Alcohol Co., Traymore.
 Griffin, F. A., G. I. M. D., Erie, Martinique.
 Griffin, R. N., Time Expert, A. C. L., Shelburne.
 Groten, Maximilian N., Russian Commission, Terminal.
 Hacking, E., M. C. B., G. T. P., Traymore.
 Hall, John M., Asst. Ch. Insp. Loco., Inter. Com. Com. Haddon Hall.
 Hannay, Wm. M., Asst. Secy., Eastern R. Assn., St. Charles.
 Hardy, W., G. F., C. R. R. of N. J., Brady House.
 Harris, E. C., Foreman, Wash. Terminal Co., Elberon.
 Hauth, W. A., Foreman Car Repairs, Penn.

(See also other registrations elsewhere in this issue)

New Devices Among the Exhibits

Klasing Hand Brake

A HAND BRAKE in which the brake staff and wheel are replaced by a tension rod and lever operating in a vertical plane is being exhibited in its booth on the pier by the National Car Equipment Company, Chicago. The device is known as the Klasing safety hand brake and is fully applied with a force equal to that of a full application of the air brake by a single movement of the handle through a vertical angle of 90 deg.

The outstanding feature of the device is the specially designed bell crank by which the vertical pull of the tension rod on the end of the car is transmitted to the brake rod. The pivot of this bell crank is not fixed, but is fitted with a gear segment which rolls on an inclined rack, the angle of which causes the motion to be downward and toward the end of the car when the brake is applied. The chain is attached at a point below and slightly back of the pivot center when the bell crank is in release posi-



The Klasing Safety Hand Brake

tion and is wrapped over a cam surface as the application movement progresses. The combined motion of the rolling center and the cam face of the lever produces a quick take-up of slack with an increase of leverage toward the end of the travel. The device has a take-up capacity of 14 in. of chain.

The operating mechanism consists of an application handle connected to a short gear shaft through a ratchet and pawl, the gear operating between fixed and movable

vertical racks. The outside of the movable rack is provided with ratchet teeth which engage a dog held in position by a reversible weight pivoted in the housing. The brake is applied by one hand; an upward pull of 175 lb. on the handle produces a pull of 3,500 lb. in the brake rods.

To release the brake the weight is turned to release position, the handle raised slightly to release the pawl and then dropped. It is carried down by the lever ratchet, which carries it slightly beyond the normal release position, causing the heel of the pawl to strike the housing. This disengages the pawl and allows the movable track to drop freely. As it reaches the bottom of its travel its upper end automatically trips the rack pawl and weight to the application position. To graduate the brake on and off sufficiently to make an accurate stop, the weight is placed in release position, the pawl released, which leaves the handle free to be lowered and raised as conditions require.

The position of the handle and the direction of its application motion is such that the element of danger always present when the usual type of hand brake is removed. A further safeguard is provided in that the operator has one hand free with which to grasp a grab iron. In releasing the brake, there is no shock on the handle to endanger the operator.

Headlights, Back-Up Lamps and Headlight Switches

NEW TYPES OF HEADLIGHTS, back-up lamps and headlight switches, all in cast-metal cases, are being exhibited by the Pyle National Company, Chicago. The headlight case is cast in one piece without seams or rivets and is fitted with a 16-inch glass reflector. The reflector is designed to meet the range of vision demanded by headlight requirements and at the same time to give a sufficient spread to illuminate the sides of the right of way. Means are provided for focusing the lamp and provision is made for a rigid conduit connection to the body of the case when desired. The case complete weighs about 110 lb.

The back-up lamps are also cast in one piece, are tapped at the top for continuous conduit and are provided with supporting lugs. The front door is hinged, fitted with a standard signal lens and closes with a spring latch. A receptacle with lamp grips is used. The connections are accessible for testing the lamp circuit. A plate glass covers an opening in the bottom of the case through which a beam of light is thrown downward and outward, lighting the coupler and step and providing positive assurance to the engine crew that the lamp is lighted. The beam of light is augmented by mirrors placed inside the case and at a suitable angle to reflect additional light to the outer portion of the lighted area.

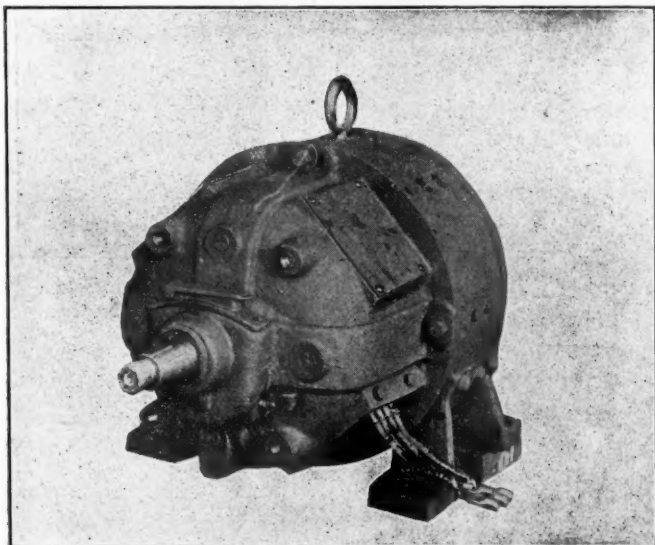
The switch is of the conduit type, tapped for conduit. The terminals are enclosed by the case and the handle is locked in its three positions. The terminals are raised from the side of the box to permit accessibility with the box mounted in any position.

D.-C. Series Motor for Crane and Hoist Service

FOR INTERMITTENT, VARYING SPEED SERVICE where heavy starting torque is required, such as for cranes and hoists, the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has recently brought out the type HK direct-current, series-wound motors. These motors are especially designed for use where the work requires a series of starts, stops and reversals, the motor being idle for only short periods of time. The motors are of enclosed construction with small openings in the lower part for ventilation. Covered openings in the top half of the frame give access to the brushes and the commutator. Compact construction, giving small overall dimensions, light weight and great mechanical strength are prominent features.

The HK motor has a forged open-hearth steel frame and solid forged-steel feet. The motors above 3 hp. rating are equipped with commutating poles so that high momentary loads can be carried without sparking, and long life of the commutator and brushes is thereby insured. All field coils are thoroughly insulated and impregnated. The brackets are strong and rigid, each being complete with an oil well and bearing housing. Oil ring lubrication is used. The brush holders are clamped to insulated rods mounted on the front brackets, which are dowelled in place. The position of the brushes is thereby fixed for both directions of rotation.

Armature coils are form-wound and thoroughly insulated and impregnated before being placed in the slots. A blower is placed in the rotor which effectively ventilates both the armature and the field windings. This allows a smaller diameter armature to be used, resulting in low flywheel effect, consequently little energy is required to start and stop the motor thereby reducing to a mini-



Type H-K Series Wound D. C. Motor

mum wear and tear on the bearings and brakes. Electrically operated shoe type brakes are supplied when ordered. They are bolted to the machined lugs on the motor bracket, making a compact unit of motor and brake. The brake is simple and rugged and provision is made for adjusting for wear of parts.

The ability of any motor to do its daily work, as far as temperature rise is concerned, is determined by the continuous rating it will carry at a safe temperature. A ventilated motor has a larger continuous rating than a non-

ventilated motor of the same short time rating. A ventilated motor rated at $7\frac{1}{2}$ hp. one-quarter hour, has about 30 per cent more continuous capacity than the non-ventilated motor rated at $7\frac{1}{2}$ hp. one-half hour. In order to utilize to advantage the ventilated feature, the HK line of motors has been rated on the one-quarter hour basis. Comparison of the whole line shows that on this basis the motors have a larger continuous rating than non-ventilated motors of the same half-hour rating.

Drinking-Cup Machine

AN INTERESTING CONTRIBUTION in the field of sanitary appliances is being exhibited at the booth of the West Disinfecting Company, in the form of a new drinking-cup machine. This device, which is manufactured by the Germproof Cup Corporation, New York, produces a perfectly formed, water-tight paper cup from a roll of paper. The operation of the machine is of a novel character and produces an inexpensive sanitary, individual drinking cup. The machine is a self-contained device, approximately the size of many containers now used for holding flat paper cups. A paper roll is inserted in the top and the turning of a handle unwinds a small portion of the roll and cuts, shapes and forms it into a drinking cup, which is delivered instantly. The cups are made and delivered with great rapidity, but the gearing is so arranged that there is no waste and the cups are discharged one at a time.

This machine is simple and ingenious in construction, and the results obtained with it are most interesting. Paper alone must be purchased and all the labor connected with the making of the cup is supplied by the actual user. It is claimed that the machine will soon pay for itself through the saving effected by its use. Another feature equally important is the sanitary character of the cup produced. Inasmuch as the paper is supplied in rolls, the cup is not made until the moment that it is to be used and is as sanitary a cup as could be obtained. From the time that the paper is made at the mill to the time that the finished cup is delivered from the machine the entire process is mechanical and no hand need ever come in contact with it. Furthermore, no glue is used in forming the cup which is absolutely tasteless and odorless.

As the cups are produced one at a time, it is impossible to obtain a number by mistake. Not only is there no waste, but the machine provides a most convenient method of obtaining a cup, and the fold on one edge



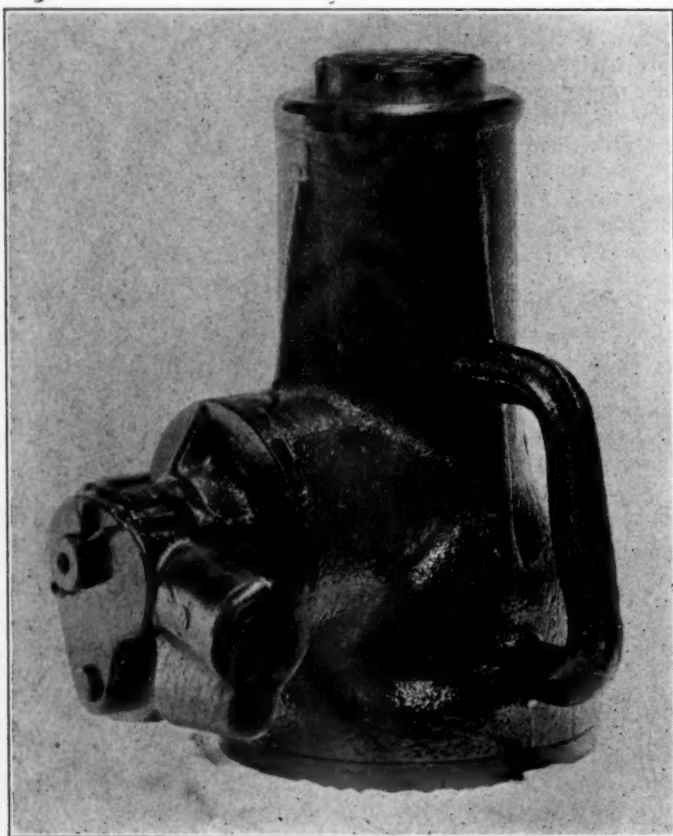
Machine for Making Paper
Drinking Cups

provides a double drinking surface, which is pleasant and safe to drink from. Where large quantities of cups are used the supply of rolls can be stored in less space than is required by packages of finished cups. Each roll of paper as now manufactured produces 500 cups and occupies a space less than 5 in. by 5 in. by 4 in. Germproof machines have been in operation for over six months.

A New Journal Jack

At its exhibit the Duff Manufacturing Co., Pittsburgh, Pa., is presenting for the first time an improved type of journal jack, which entirely eliminated the dangerous possibility of raising the load too far. With previous types of journal jacks there was often the chance of a careless workman continuing to operate the jack until the standard was pushed up out of the base, with likelihood of damage and serious injury. The new Duff journal jack is so constructed that it cannot be raised beyond its maximum height.

Another new feature of this jack is that the head is unusually small. While amply large to carry the load,



Huff Ball Bearing Screw Type Journal Jack

the small diameter facilitates placing the jack in confined places and compels even the most careless workman to place the jack squarely under the journal box. The standard is keyed to prevent the jacks from rotating under load.

The jack is of the ball-bearing screw type. Large ball bearings, of alloy steel, are used to support the load, reducing friction. Each ball is capable of withstanding, without crushing, a pressure equal to the maximum rated capacity of the jack. The lifting screw of high carbon crucible steel heat treated and the nut in which

the screw rotates is of a special alloy, which combines extreme toughness with a very low co-efficient of friction. The gears are machine cut from special steel, case hardened and heat treated. The new Duff Journal Jack is made with capacities of 15 and 25 tons, and with heights of 8, 9 $\frac{3}{4}$ and 11 in.

Electric Water Cooler

THE SAFETY CAR HEATING & LIGHTING COMPANY, New York, has produced an electric water cooler so designed that it can be applied to an ordinary car cooler or be used in the space now occupied by one. No ice is required, the machine being operated by a motor.

The lower part of the cooler is of the well-known inverted bottle type except that there is a coil of pipe and a thermostat in the small tank below the bottle. The bottle has a capacity of two gallons. Above the bottle is a radiator and an electric motor which drives a small compressor and a fan. The system contains a small quantity of refrigerating medium.

When the temperature of the water in the tank rises to 45 deg. the thermostat causes an automatic switch to close which starts the motor, compressing the refrigerant to a liquid state in the radiator while the fan, blowing air over the radiator, carries away the heat of compression. The liquefied gas then flows to the cooling coil in the tank where it is expanded, absorbing heat from the water around the coil. The expanded gas then goes again to the compressor and the cycle is repeated. The motor is stopped by the thermostat when the temperature of the water falls to 40 deg.

The complete outfit is contained in a cylinder 3 ft. 9 in. long by 10 in. in diameter. The device can be operated from any source of electric power for which fractional horsepower motors are designed.



Two Gallon Electric Water Cooler

Easily Controlled Air Hoist

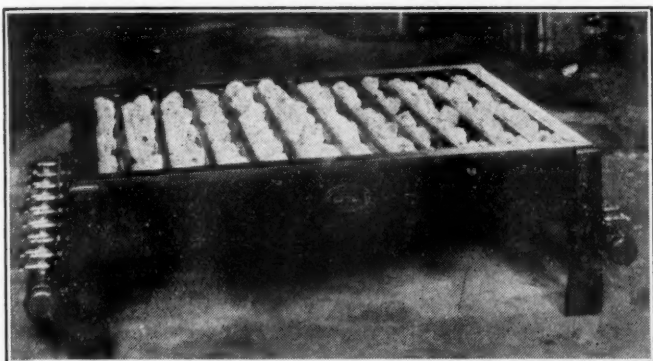
A NEWLY DEVELOPED pneumatic motor hoist, which was described in the May *Railway Mechanical Engineer*, is being exhibited by the Independent Pneumatic Tool Company, Chicago, Ill. This hoist is made in $\frac{1}{2}$ -ton, 1-ton and 2-ton sizes and owing to the use of a throttle valve with graduated opening, it is exceptionally easy to control the motor speed. The motor is reversed by shifting the eccentric with throttle chains, while the valve is shut off. The hoist is provided with a large worm gear drive. Safety in operation is secured by the worm gear which holds the load even should the motor be entirely removed for repairs. Automatic stops prevent injury to either the load or the hoist.

The Wiederwax Preheater

IN PERFECT PREHEATING for welding three elements are necessary: even heat, control, and facility of handling.

Up to the present time charcoal has been the almost universal method of preheating, on account of the fairly even heat obtainable. But though it can be made to burn evenly, a charcoal fire is not always controllable, and moreover is difficult to work with in more ways than one. There are, in addition to charcoal, torches and furnaces of various sorts. While these are adapted to certain kinds of work with more or less successful results, their work is not always efficient, and their scope is decidedly limited.

The Wiederwax preheater, manufactured by the Geist Manufacturing Company, Atlantic City, N. J., is a continuous heating medium using for fuel, artificial or natural gas or gasoline. It is square in shape, with a large flat table surface. This table consists of a heavy metal grating, between the bars of which is placed a special heat-absorbing element reaching downward to a depth of about six inches. This refractory heating substance



Floor Model, Wiederwax Preheater

absorbs the heat furnished by a series of specially constructed burners, and distributes it until it becomes a cherry red all over, thus giving off a soft radiant heat whose temperature is the same at all points of the heating surface, and which is controllable at all times, to almost any degree of temperature.

The burners supplying the heat are placed in rows, each row running from the side to the center, and each row controlled by its own valve. This arrangement makes it possible to use any number of burners and thus, any part of the heating surface desired either in width or depth.

Immediately beneath the burners is the cooling oven, the ceiling of which is formed by a series of perforated pipes, whose open ends run outward through the sides of the preheater, just between the burner valves. As soon as they become hot from the fire over them, air is automatically circulated through them, heated and radiated into the oven underneath.

This oven is square and roomy and is provided for the cooling of finished jobs. It retains a heat ranging downward from 500 deg. F., according to the number of burners in operation, is free of all draught, and reduces the heat of the finished piece with a slow even contraction, thus removing the danger of warping and cracking.

Welding with the Wiederwax preheater has many advantages over the use of charcoal, the chief drawback to which is the trouble it requires in preparing for a preheating job, and the awkwardness and uncertainty in handling the job once it is upon the fire. First an oven of fire-brick must be built, the charcoal placed in it and

fired, and then carefully nursed to the point where it will burn evenly. The slightest draught may heat the fire in spots, which at once endangers the piece being preheated. Such a process requires time, in the case of the ordinary charcoal fire, from a half hour to an hour.

If there is more than one piece to be welded, the chances are that a separate fire must be built for each one, for usually when the weld is completed and the piece taken off, the fire is either broken down or scattered. If the piece is a big one, requiring several welds at different points, it is next to impossible to turn it without breaking down the fire. This necessitates long waits between welding, and much labor and time in attending to fires. The operator, working with charcoal, is at a disadvantage. He must bend low over the charcoal fire to do his welding. He works in the face of smoke, fumes and flying sparks.

With the Wiederwax preheater, the operator turns on the number of burners he may require, strikes a match, and his fire is ready. In this operation, from one-half to one hour is saved in labor and time on each job, for as high as six, or even more, jobs may be heated upon this preheater at one time, each job requiring a different degree of temperature. This is made possible by the arrangement of the burners, which may be used wholly or in part. Any part of the heating surface may be used by one man while another, and even a third, may use still another part, each man utilizing a different degree of heat. Or if there be only one operator, he can weld one job while the next is heating.

The operator stands in the normally erect position while working. His eyes are clear of smoke, his lungs free of fumes, and he moves about with perfect freedom and ease. The job upon which he may be working may require any number of welds. It may be turned very easily, without breaking down a fire, or losing any of its heat, thus saving both time and annoyance. As fast as one job is finished it may be transferred to the cooling oven with very little effort, and the next piece set in its place for preheating.

The Wiederwax Floor Model

This model is designed specially for large castings of all kinds, and obviates all danger of uneven heating. Its construction and operating methods are precisely the same as in the table models, though because of its size and range, the cooling oven has been dispensed with and the frame supporting the burners is placed on a foundation at the floor level. Some remarkable welding work has been accomplished with this preheater and large castings have been successfully preheated which could not possibly have been handled with a less efficient preheater.

Locomotive Recorders

ISTRUMENTS for recording the speed and actual mileage of both road engines and switchers are being exhibited at Space 747, in the balcony, by the Speedograph Corporation, Newark, N. J. A detailed description of the Model K recorder designed for use on road engines is given on page 306 of the *Railway Mechanical Engineer*. Complete and important information regarding train operation over a division can be obtained. Maximum allowable speeds on curves and at other points where there are speed restrictions may not be exceeded without leaving a tell-tale record on the recording tape. This results in increased safety and a reduction of wear and tear on rolling stock. The Model L recorder gives the same information for switchers. Both instruments

are of comparatively simple, rugged construction, and do not require expert mechanical ability to keep them in operating condition.

Wheel and Ratchet Lever Brake Tests

THERE HAS BEEN A GREAT DEAL OF CONTROVERSY in the past as to the force developed on the brake chain with various diameters of brake wheels and also as to the power that could be developed with ratchet brake levers. In order to arrive at some definite conclusions a series of tests was recently conducted by R. H. Blackall, Pittsburgh, Pa. The accompanying tabulation shows the chain pulls recorded through a dynamometer under the conditions noted. The chain was of $\frac{7}{16}$ -in. diameter and the winding drum of $1\frac{1}{2}$ -in. diameter.

RESULTS OF TESTS		
	Avg. pull made by 3 brakemen and 7 office men	Avg. of all pulls made on tests
15 in. ratchet lever brake		1,540 lb.
18 in. ratchet lever brake	2,080 lb.	2,040 lb.
24 in. ratchet lever brake	2,320 lb.	2,410 lb.
15 in. brake wheel		1,300 lb.
15 in. brake wheel (with 28 in. club)....		2,040 lb.
16 in. brake wheel		1,440 lb.
16 in. brake wheel (with 28 in. club)....		2,280 lb.
18 in. brake wheel		1,440 lb.
18 in. brake wheel (with 28 in. club)....		2,560 lb.

Variation of results from which the averages were made, aside from difference in the strength of the operators, was due largely to the position of the chain on the shaft at the time each obtained his maximum pull. This, however, is the condition found in actual practice.

The leverage is greater when the vertical link starts to mount the shaft than it is when the horizontal link is in a corresponding position. Also, as the horizontal link starts to mount the shaft, the small curvature of the chain shoulders the shaft and presents an obstruction which has to be overcome before the chain can be wound up further and thus register a greater reading on the dynamometer.

A comparison of the average pull made on these same tests by the one brakeman and those made by three brakemen and seven spectators, demonstrated that the spectators caused a drop in the average chain pull of but 100 lb. with both the 18 and 24-in. lever tests, while with the 16-in. diameter wheel the average was pulled down 350 lb. This was also the case in the test with a 28-in. club used on the 16-in. wheel. This would indicate that an inexperienced man can obtain approximately full power with a lever brake, whereas experience is required to obtain the usual power with a wheel or with a wheel and a club.

The difference in the results obtained with the 15-in., 16-in. and 18-in. wheels in connection with a club can be explained by the fact that the smaller the diameter of the wheel the more nearly vertical is the position the club assumes. This means an actual loss in leverage with the smaller wheels, as is shown by the tabulation. A dished wheel has the same effect as a smaller diameter wheel. It will be noted that an 18-in. leveraged ratchet is a little less powerful than a 16-in. brake wheel with a 28-in. club, and that a 24-in. leveraged ratchet is more powerful than a 16-in. wheel used in conjunction with a 28-in. club.

Ratchets have been condemned many times by brakemen because the length of the old "pick handle" looked good to them, not realizing that, so long as the brake was efficient, it mattered not whether the power was obtained by the length of the pick handle or by a ratchet brake lever in connection with a properly designed foundation gear. Knowing that a pick handle would be used, it has been the practice of railroads, in order to avoid wheel

sliding when a club was used, purposely to design a hand brake of low efficiency. This meant a very low braking power when the club was not available, and a brake, when the club was used, proportionate to the length of the club.

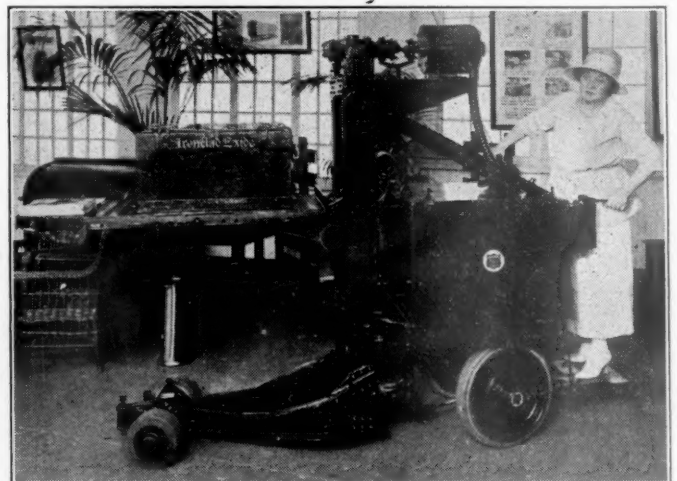
By the use of a ratchet a pre-determined leverage can be used and the foundation gear arranged to provide a hand brake equivalent in efficiency to that of the air brake. The ratchet not only provides an efficient brake, but also, as it is located below the top of the car, eliminates bent brake shafts which are accountable for switching charges, per diem charges, labor and material, loss of earning power of car, and it also reduces car shortage.

There are now approximately 250,000 ratchets in service on open top cars and the brakemen are ceasing to object to this innovation.

It should be borne in mind that, in operating a ratchet, a brakeman must of necessity hold with one hand to a grab iron or the top of the car, which adds an element of safety to the operation of this type of brake when compared with the ordinary type. In using a club the theoretical way is to stand to the left of the shaft and pull. Usually, however, a brakeman will stand on the right of the shaft and push. In this position, if the chain should break, the brakeman is in a very precarious position. The chain is tested at the factory when manufactured but is not designed with the expectation of a long pick handle being used; sometimes two brakemen double back over the hand brakes with two clubs on heavy grades. From this it will readily be seen that a properly designed ratchet is a long step towards "Safety First."

A Tying Truck

THE "TIER-LIFT" TRUCK exhibited by the Lakewood Engineering Company, Cleveland, is a new type of tying truck which was described in detail in a recent issue of the *Railway Age*. The functions of the truck are to quickly and economically pick up and carry loads to their destination and to elevate the loads to heights sufficient for piling material in box cars, store rooms and other places where cranes are not available.



Sophie Tucker Operating a Tier Lift Truck

The machine combines the features of a load carrying truck and a tying machine. It is built for three tying heights, namely, 42, 60 and 76 in.

Sophie Tucker has taken her turn at operating the machine and she suggests that women should have no difficulty in operating these trucks, and that they will be a factor in reducing the high cost of everything.